California MEDICINE
OFFICIAL JOURNAL OF THE CALIFORNIA MEDICAL ASSOCIATION
Volume 87 OCTOBER 1957 Number 4

Modern Treatment of Abruptio Placentae

JAMES A. MERRILL, M.D., San Francisco

HEMORRHAGE CONTINUES to be one of the major causes of maternal death. Deaths due to infection have decreased sharply but there has been much less change in the proportionate number of deaths due to other members of the classical triad—toxemia and hemorrhage. The work of several maternal welfare committees indicates that probably 75 per cent of hemorrhagic deaths are preventable. Therefore, in order to reduce maternal mortality further, the prevention, control and treatment of hemorrhage must

75% úmrtí na krvácení je pravděpodobně preventabilních

separation is that found by pathologic examination of the placenta. Moreover, diagnosis and treatment of abruptio placentae are frequently linked with another complication of pregnancy—toxemia.

From the Department of Obstetrics and Gynecology, University of California School of Medicine, San Francisco 22.

Presented before the Section on Obstetrics and Gynecology at the 86th Annual Session of the California Medical Association, Los Angeles, April 28 to May 1, 1957.

SYSTEMIC EFFECTS OF ABRUPTIO PLACENTAE

Various lines of investigation have shown the severe grade of premature separation of the placenta to be accompanied by systemic effects, some of which are potentially lethal, and which include:

1. Clinical shock, sometimes out of proportion to blood loss or hypotension.
2. Disseminated deposition of fibrin.

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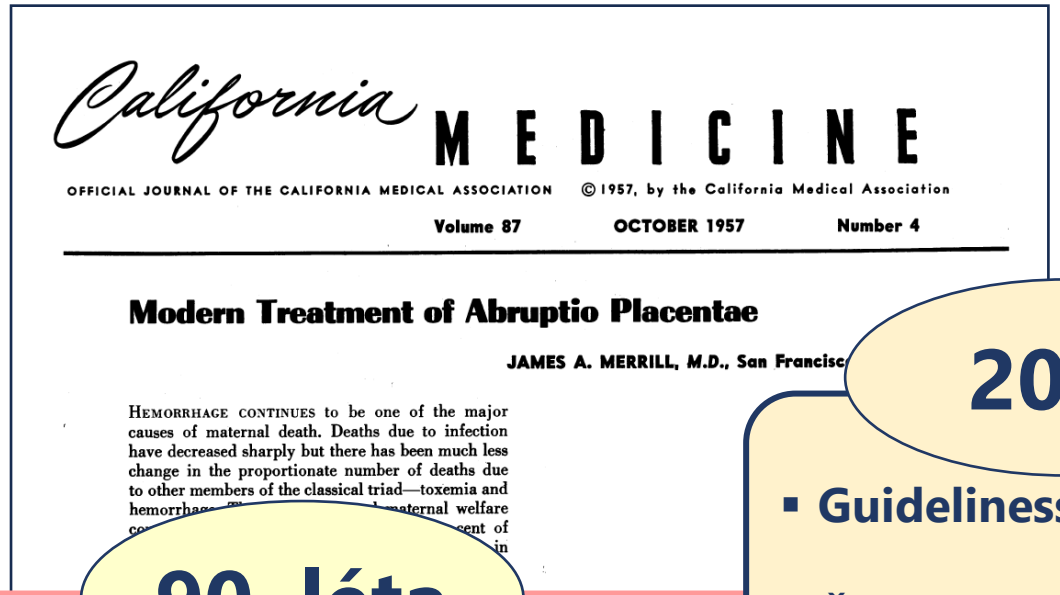
1957



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90. léta

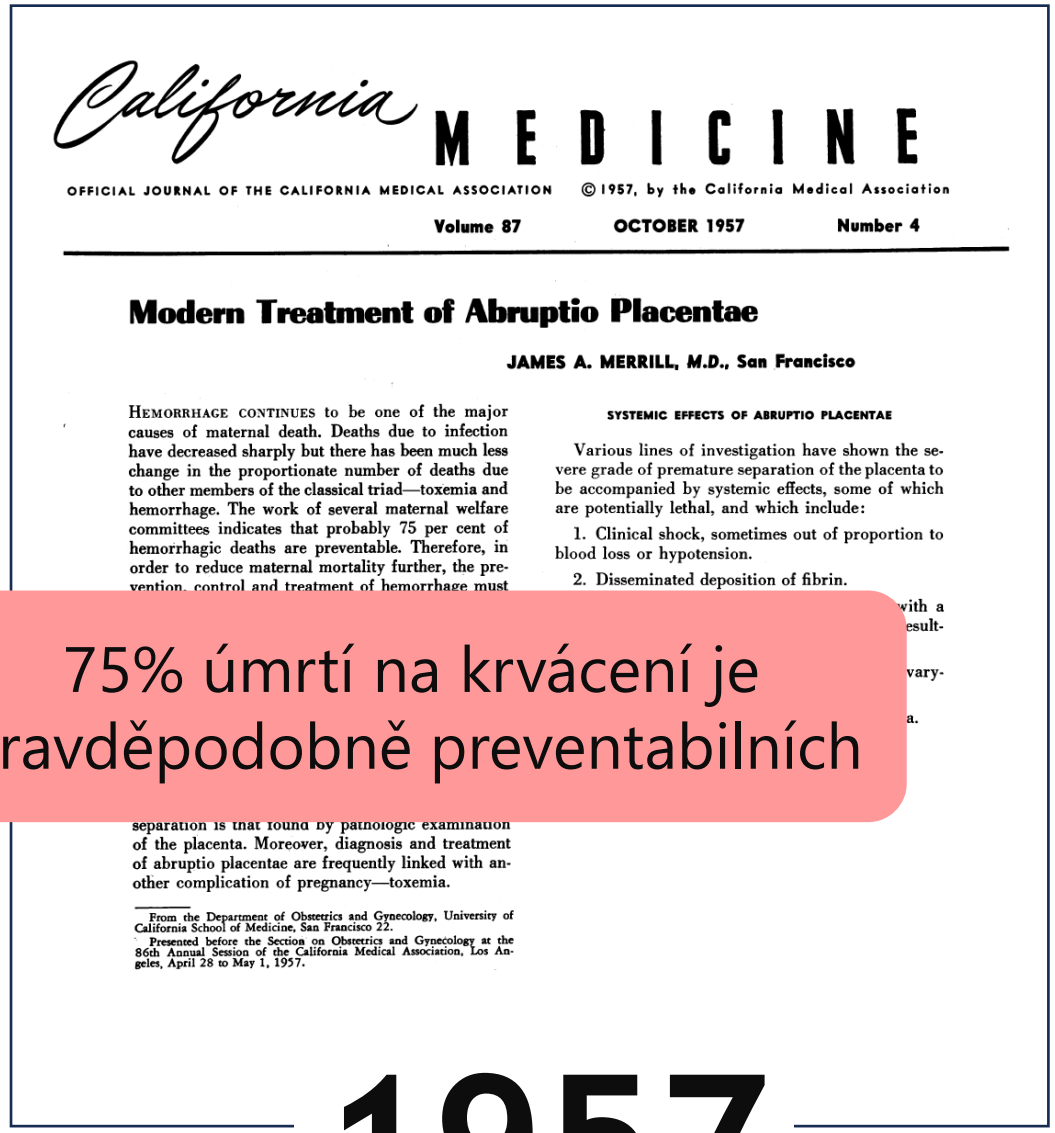
- **Objemová resuscitace**
  důraz na volumoterapii krystaloidy
- **Liberální používání TRF** (EKR),
  omezené používání plazmy a krevních destiček (vyváženost terapie krevními složkami se neřešila…)
- **Heparin, antitrombin !!!**

2000

- **Guideliness** lokalizované pro PPH
- **Časné použití TRF**
  vyvážené poměry transfuzních komponent 1:2 (1:1)
- **Novoseven** !
- Začátek používání koncentrátů faktorů a antifibrinolytik

2010+

- **Protokoly masivní transfuse**
  pro rychlou a standardizovanou reakci
- **Bedside monitoring koagulace**
  pro cílené řízení koagulační podpory
- **Tranexamová kyselina**
  rutinní používání na základě CRASH-2 a WOMAN-Trial
- **Koagulační faktory /fibrinogen**
  rychlejší a bezpečnější než plasma
- Plná krev



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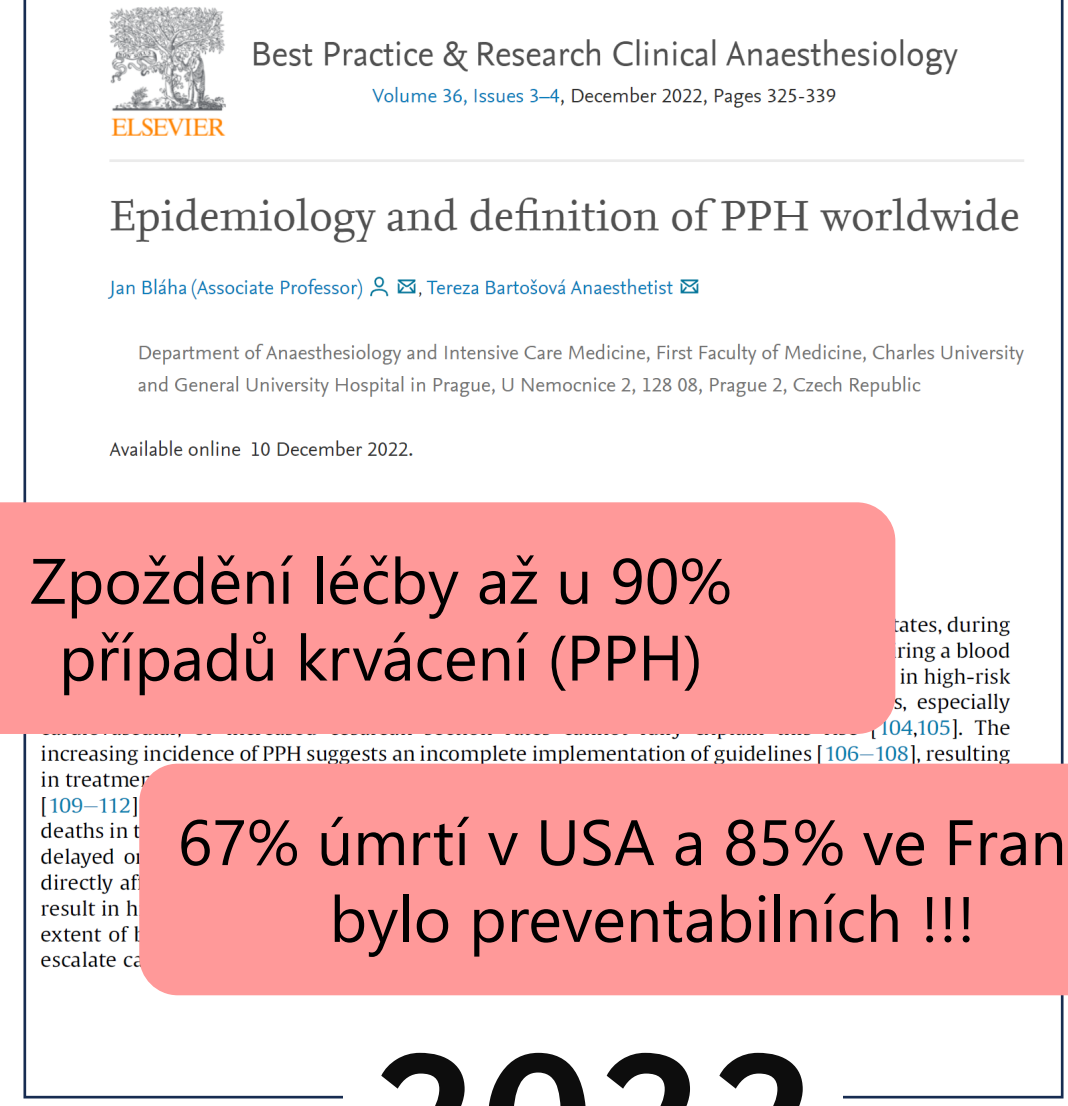


Best Practice & Research Clinical Anaesthesiology

Volume 36, Issues 3–4, December 2022, Pages 325-339

Epidemiology and definition of PPH worldwide

Jan Bláha (Associate Professor), Tereza Bartošová Anaesthetist

Department of Anaesthesiology and Intensive Care Medicine, First Faculty of Medicine, Charles University and General University Hospital in Prague, U Nemocnice 2, 128 08, Prague 2, Czech Republic

Available online 10 December 2022.

Zpoždění léčby až u 90% případů krvácení (PPH)

67% úmrtí v USA a 85% ve Francii bylo preventabilních !!!

2022

Satelitní sympozium společnosti CSL Behring

Život ohrožující krvácení – proč to dělám jinak než ostatní?

Čtvrtek 19. 9.2024, 12:15–13:15

1. Kapesní průvodce peripartálním krvácením – doc. MUDr. Jan Bláha, Ph.D., MHA, LLM – VFN
2. Život ohrožující krvácení s DOAC – MUDr. Kamil Vrbica, FN Brno
3. Co dělat, když pacient po pumpě pořád "teče"... – MUDr. Petr Kopecký – VFN

KAPESNÍ PRŮVODCE
PERIPARTÁLNÍM KRVÁCENÍM

JAN BLÁHA

KLINIKA ANESTEZIOLOGIE, RESUSCITACE A INTENZIVNÍ MEDICÍNY

1. LÉKAŘSKÁ FAKULTA
Univerzita Karlova

VŠEOBECNÁ FAKULTNÍ NEMOCNICE V PRAZE

jan.blaha@vfn.cz

DOKUMENTY ČSARIM A ČSIM ČLS JEP

Diagnostika a léčba život ohrožujícího krvácení u dospělých pacientů v intenzivní a perioperační péči

Česko-slovenský mezioborový doporučený postup

DIAGNOSTIKA A LÉČBA PERIPARTÁLNÍHO ŽIVOT OHROŽUJÍCÍHO KRVÁCENÍ

Česko-slovenský mezioborový konsenzus

Doporučený postup

EJA European Journal of Anaesthesiology

GUIDELINES

Haemostatic Management in Postpart

A review of the literature and expert

Hofer S[1], Blaha J[2], Collins P[3], Ducloy-Bouthors A-S[4], Guasch E[5], Lab and Van de Velde M[10]

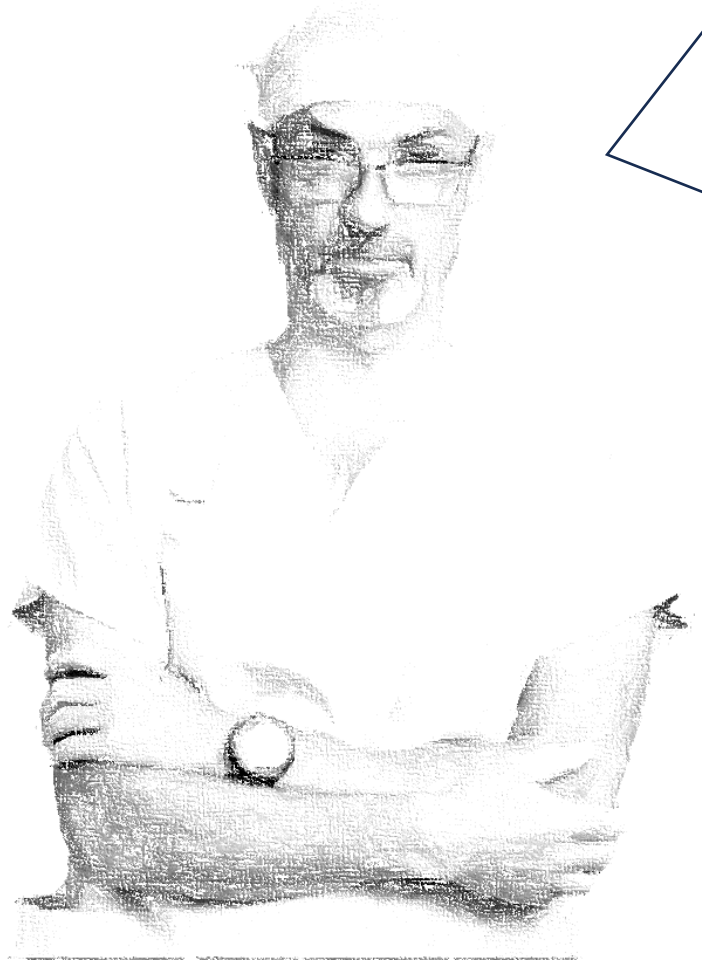
Eur J Anaesthesiol 2022

Použití plné krve u pacientů se život ohrožujícím krvácením v důsledku traumatu: souhrn a konsenzus jednání mezioborového panelu

Tento článek je převzatý z časopisu Anesteziologie a intenzivní medicína se souhlasem vydavatele.

Anest. intenziv. Med. 2024;35(2):127–130. doi:10.36290/aim.2024.022.

Možný konflikt zájmů: CSL Behring AstraZeneca



TAKE HOME MESSAGE:

- Ne každé krvácení je KRVÁCENÍ
- Spěchej, a bude to v pohodě !
- Konečně se přiznalo, že bez koloidů to nejde
- „Fibrinogen, fibrinogen, fibrinogen“
- Let‘s go octaplas
- Krev NEEEEE !

Postpartální nebo peripartální krvácení ?

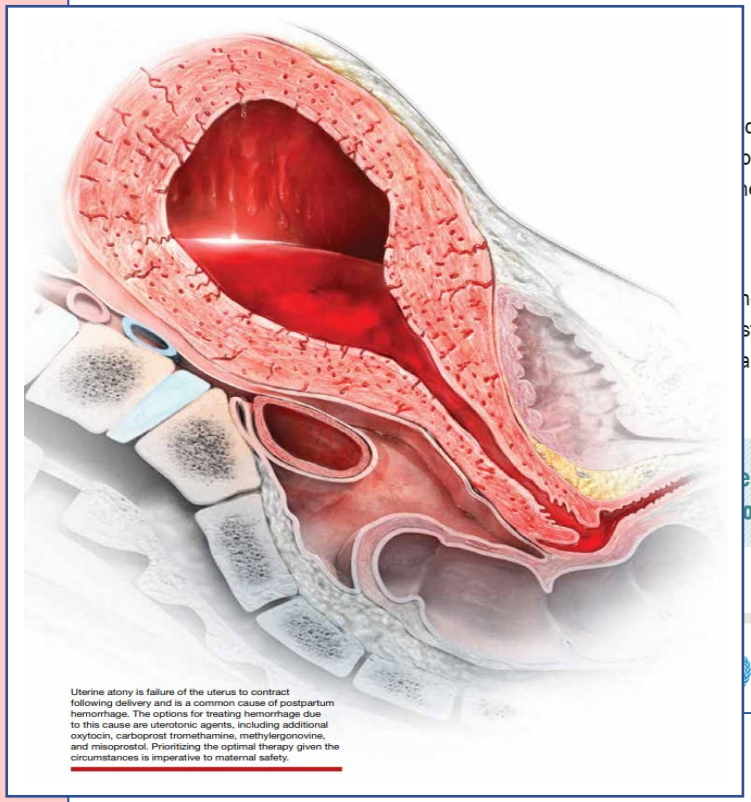
Antepartální (postihuje 2–5% všech těhotenství)

- Placenta previa
- Abrupce placenty
- Trauma
- Ruptura dělohy

Postpartální (komplikuje asi 5% všech porodů)

- Atonie dělohy je zodpovědná za drtivou většinu poporodního krvácení (až 70-90%)

What is postpartum haemorrhage?



Uterine atony is failure of the uterus to contract following delivery and is a common cause of postpartum hemorrhage. The options for treating hemorrhage due to this cause are uterotonic agents, including additional oxytocin, carboprost tromethamine, methylergonovine, and misoprostol. Prioritizing the optimal therapy given the circumstances is imperative to maternal safety.

d deaths could be avoided by
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en during childbirth to prevent
tep towards achievement of
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eaths occur in low- and
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World Health Organization

human reproduction programme hrp research for impact

Walfish M, *et al*. *Br J Anaesth* 2009;103:i47–56;
WHO PPH guidelines 2018.
Evensen A, *et al*. *Am Fam Physician* 2017;95:442–9
Barbieri. OBG Manag. 2016 July;28(7):8-10,12

Established in 1871
Swiss Medical Weekly
Original article | Published 13 November 2017 | doi:10.4414/14551 Cite this as: Swiss Med Wkly. 2017;147:w14551

Temporal trends of postpartum haemorrhage in Switzerland: a 22-year retrospective population-based cohort study

Kaelin Agten Andrea[a], Passweg Daniel[b], von Orelli Stephanie[b], Ringel Nancy[c], Tschudi Ruedi[d], Tutschek Boris[e]

[a] Fetal Medicine Unit, St George's University Hospital NHS, London, United Kingdom
[b] Department of Obstetrics and Gynaecology, City Hospital Triemli Zurich, Switzerland
[c] Department of Obstetrics and Gynecology, New York University School of Medicine, USA
[e] Pränatal Zürich, Zurich, Switzerland, and Medical Faculty, Heinrich Heine University, Düsseldorf, Germany

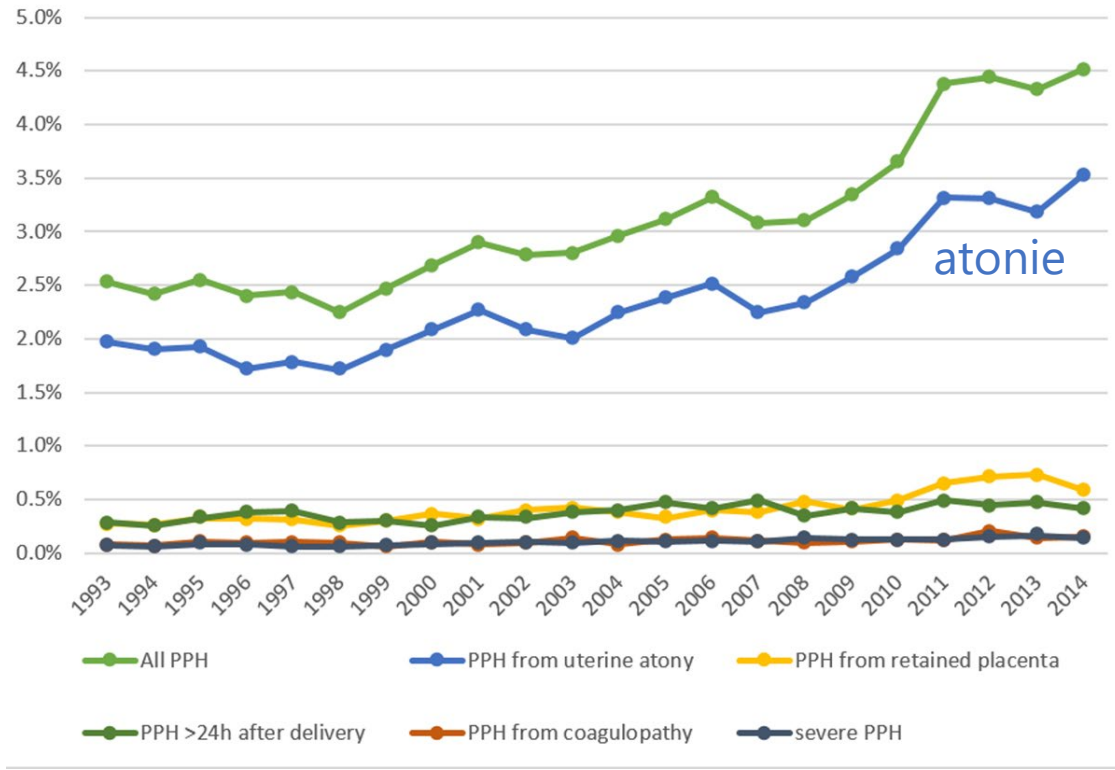


Figure 1 **Incidence of postpartum haemorrhage over the 22-year period.** Trends in the rate of postpartum haemorrhage (PPH) and haemorrhage by underlying aetiology from 1993 to 2014. The increase in all PPH was paralleled by a rise in uterine atony. Y-axis indicates the incidence (in %) and x-axis shows the corresponding year.

Table 1: Risk factors associated with postpartum haemorrhage.

	1993 (n = 33 465) %	2014 (n = 33 612) %	p-value for trend
Maternal factors			
Age groups			
Age <19	1.4	1.1	<0.001 ↓
Age 20–34	87.8	78.4	<0.001 ↓
Age 35–39	9.5	17.2	<0.001 ↑
Age >40	1.3	3.3	<0.001 ↑
Pregnancy-related factors			
Fetal macrosomia	9.4	8.3	<0.001 ↓
Hypertension / pre-eclampsia / eclampsia / HELLP	3.3	3.0	0.531 →
Polyhydramnios	0.3	0.9	<0.001 ↑
Chorioamnionitis	0.2	0.3	0.513 →
Placenta praevia	0.3	0.5	<0.001 ↑
Placental abruption	1.3	1.5	<0.001 ↑
Twin-pregnancy	0.8	1.6	<0.001 ↑
Abnormally invasive placenta	0.2	0.3	0.035 ↑
Delivery-related factors			
Induction of labour	15.4	19.0	0.002 ↑
Delivery Mode			
Spontaneous vaginal	77.0	58.6	<0.001 ↓
Operative vaginal	9.5	10.5	<0.001 ↑
Elective caesarean	7.0	16.0	<0.001 ↑
Emergency caesarean	6.5	14.9	<0.001 ↑
Prior caesarean delivery	7.4	14	<0.001 ↑
Episiotomy	59.9	13.1	<0.001 ↓
Epidural anaesthesia	9.9	27.3	<0.001 ↑
Prolonged 1st stage	2.1	2.4	0.004 ↑
Prolonged 2nd stage	4.5	8.4	<0.001 ↑
Labour augmentation, using oxytocin	24.6	26.2	0.277 →
Fever during labour (>38°C)	0.4	0.5	<0.001 ↑

věk

SC

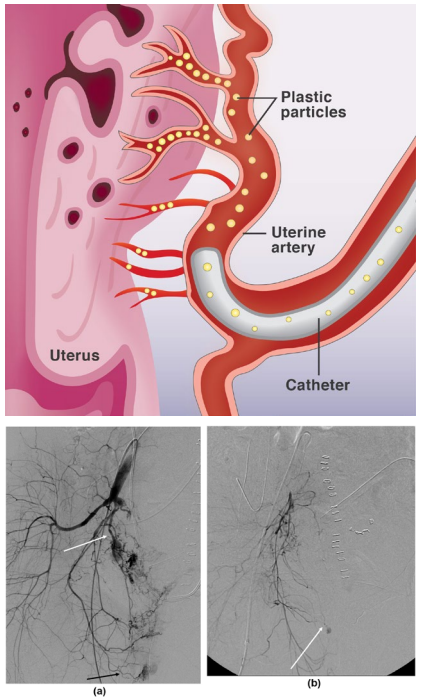
The NEW ENGLAND JOURNAL of MEDICINE

REVIEW ARTICLE

N Engl J Med 2021;384:1635-45. DOI: 10.1056/NEJMra1513247

Postpartum Hemorrhage

Jessica L. Bienstock, M.D., M.P.H., Ahizechukwu C. Eke, M.D., Ph.D., and Nancy A. Hueppchen, M.D.



Development of Postpartum Hemorrhage

Estimated Blood Loss of 1000–1500 ml

- Call for help from nursing, additional obstetrical providers
- Notify anesthesia, blood bank, interventional radiology suite, operating room
- Place additional IV catheter
- Deliver placenta, membranes, and any retained products of conception
- Place urinary catheter to monitor urine output and assist in uterine contraction
- Perform bimanual uterine massage and manual uterine exploration and evacuate retained tissue or clots
- Administer IV fluid to replace blood loss (crystalloids, colloids)
- Administer pharmacotherapy (oxytocin, methylergonovine, carboprost, misoprostol)
- Examine and repair any genital tract lacerations

Estimated Blood Loss of >1500–3000 ml

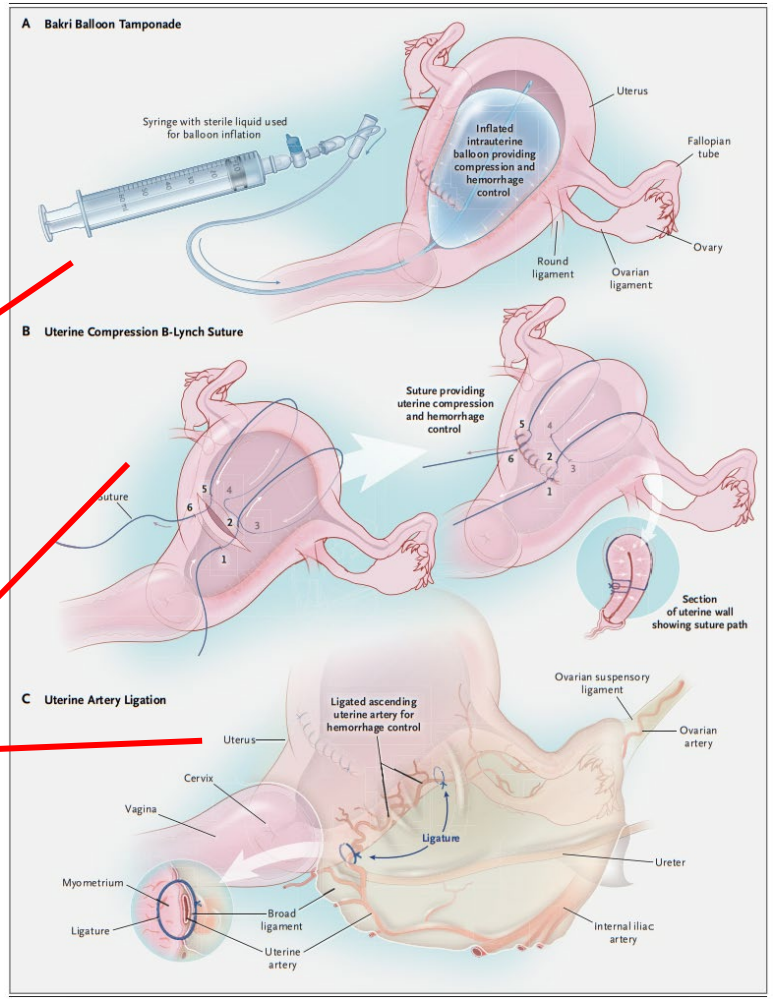
- Monitor laboratory values (CBC, BMP, T and S, fibrinogen, PT, aPTT, lactate)
- Monitor for coagulation (thromboelastography or rotational thromboelastometry)
- Place arterial catheter, central venous catheters
- Administer blood and blood products (especially if patient is hemodynamically unstable)
- Continue to administer pharmacotherapy to maximum tolerated doses
- Place uterine tamponade device (e.g., Bakri or Rusch balloon tamponade)
- Administer tranexamic acid

Estimated Blood Loss of >3000 ml

- Continue transfusion of red cells, FFP, and platelets according to local protocols (e.g., 1:1:1 ratio)
- Continue to monitor laboratory values (CBC, BMP, T and S, fibrinogen, PT, aPTT, lactate)
- Continue to monitor for coagulation (thrombo-elastography or rotational thromboelastometry)
- Consider readministration of tranexamic acid
- Consider recombinant factor VIIa therapy (in hemophilia A or B)
- Consider uterine artery embolization (if patient is stable) with interventional radiology
- Perform laparotomy
  - Repair any uterine lacerations or uterine rupture
  - Place uterine compression sutures (e.g., B-Lynch, Hayman, Cho, Esike methods)
  - Perform stepwise suture ligation
    - Perform bilateral uterine artery ligation (O'Leary sutures)
    - Perform bilateral utero-ovarian artery ligation
    - Perform internal iliac artery ligation
  - Perform hysterectomy (total or supracervical — may be appropriate earlier in management, particularly if future childbearing is not desired)

Figure 1. Postpartum Hemorrhage (PPH) Screening, Evaluation, and Management.

The abbreviation aPTT denotes activated partial-thromboplastin time, BMP basic metabolic panel, CBC complete blood count, FFP fresh-frozen plasma, IV intravenous, PT prothrombin time, and T and S type and screen.



JOURNAL OF SURGICAL RESEARCH • APRIL 2024 (296) 735–741

Is REBOA the Last Card to Control a Massive Bleeding?

Fernando Rodríguez-Holguín, MD,[a,b] Alexander Salcedo, MD,[a,b,c] Philip Leib, MD,[d] Yaset Caicedo, MD,[d] José Julián Serna, MD,[a] Luis Toro, MD,[a] Sandra Carvajal, MD,[e] Manolo Riascos, MD,[e] and Carlos A. Ordoñez, MD, FACS[a,b,c,]*

[a] *División de Cirugía de Trauma y Emergencias, Fundación Valle del Lili, Cali, Colombia*
[b] *Department of Trauma and Acute Care Surgery, Universidad Icesi, Cali, Colombia*
[c] *División de Cirugía de Trauma y Emergencias, Universidad del Valle, Cali, Colombia*
[e] *Departamento de Medicina de Emergencias, Fundación Valle del Lili, Cali, Colombia*
[f] *Department of Trauma Critical Care, Broward General Level I Trauma Center, Fort Lauderdale, Florida*

Brede *et al. Critical Care* (2022) 26:57 https://doi.org/10.1186/s13054-022-03942-0

COMMENT Open Access

Resuscitative endovascular balloon occlusion of the aorta: the postpartum haemorrhage perspective

Jostein Rødseth Brede[1,2,3,4*], Edmund Søvik[5] and Marius Rehn[2,6,7]

Keywords: REBOA, Postpartum haemorrhage, PPH, Aortic occlusion

Not only in trauma centres, but also in hospitals with obstetric departments, REBOA should be considered an emergency procedure to be immediately available 24/7 by physicians trained in ultrasound-guided and fluoroscopy-free Seldinger technique. Local considerations will decide whether the REBOA is placed by an emergency physician, anaesthesiologist, obstetricians, interventional radiologist or the general surgeon.

Conclusions

REBOA carries more indications than trauma and should be increasingly considered and evaluated in management of PPH. REBOA may not only save a life, it might also save a uterus.

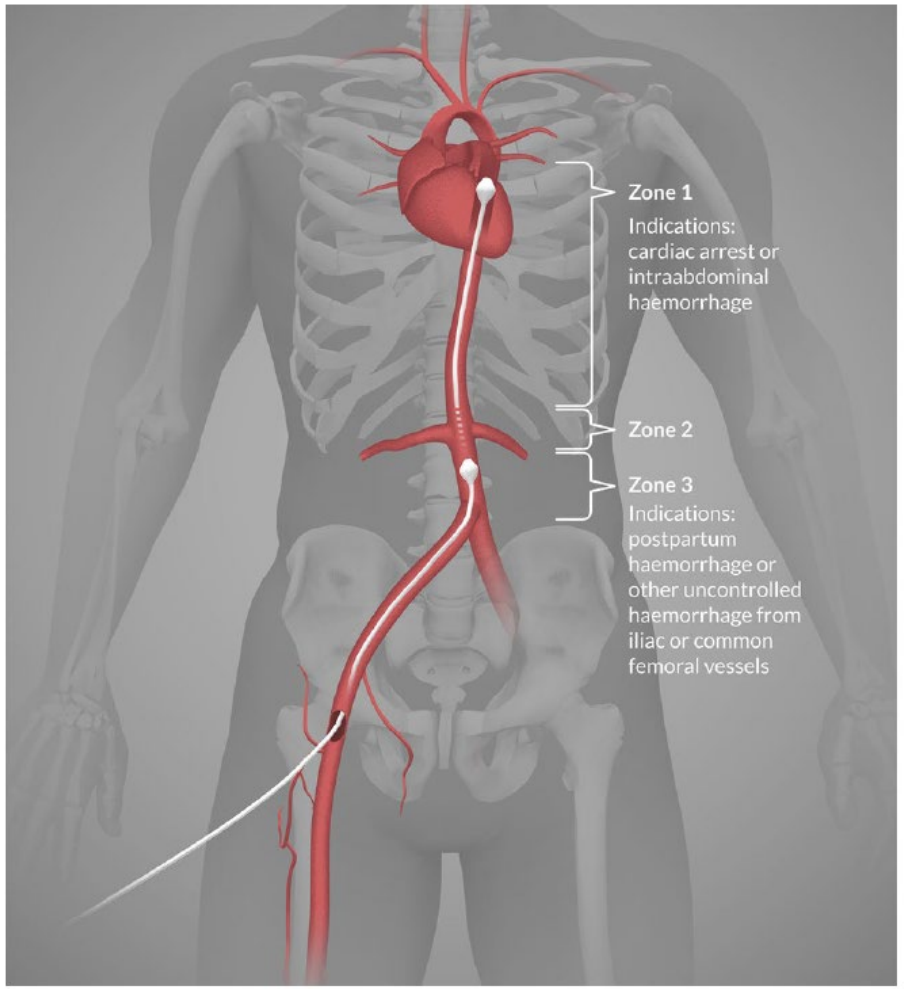
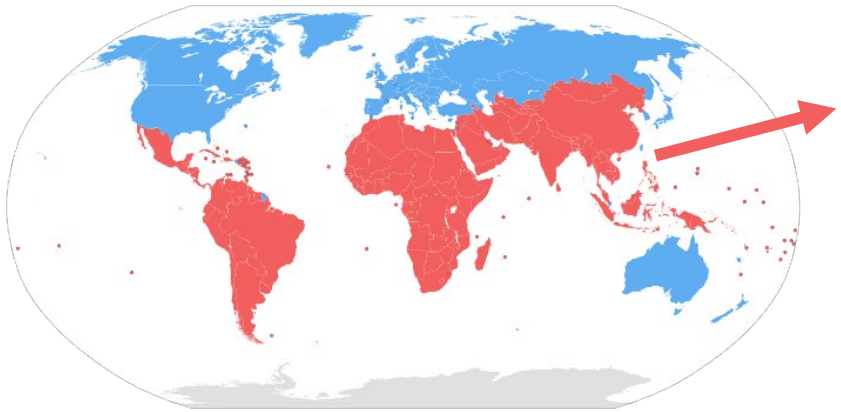


Fig. 1 Aortic zones and indications for occlusion



Second Edition

Helping Mothers Survive

Bleeding after Birth

ACTION PLAN

Prepare for birth

Birth (See HBB Action Plan for baby)

10 IU or 200 mcg x 2 or 3 = 400 - 600 mcg

Give medication within 1 minute

Cut the cord between 1-3 minutes

Injectable uterotonics:
- Oxytocin - 10 IU IM/IV
- Carbetocin - 100 mcg IM/IV
- Ergometrine - 0.2 mg IM/IV
- Oxytocin (5 IU) and ergometrine (0.5 mg) IM

The Golden Minute*

Perform controlled cord traction to deliver placenta

Placenta out?

Out

Check tone
Massage if soft

Placenta complete?

Complete

Uterus hard?

Hard

Bleeding normal?

Normal

Continue care
Check tone
Monitor bleeding
Check vital signs
Encourage breastfeeding

Not out in 30 minutes

Encourage empty bladder
Repeat 10 units oxytocin
Repeat controlled cord traction

Out

Not out in 60 minutes

Incomplete

Advanced care

Soft

Massage uterus
If still soft
Give medication

Hard Heavy bleeding

Soft Heavy bleeding

Press on tears

Compress uterus

Hard Bleeding normal

If available

Rapidly apply NASG

Keep warm
Seek advanced care

Helping Mothers Survive

Prevent and manage shock from PPH

ACTION PLAN

SIGNS OF SHOCK

If bleeding heavily

Shout for help
Conduct rapid assessment

If oxytocin not available or does not stop bleeding, give:
- Ergometrine 0.2 mg IM or IV slowly
- Misoprostol 800 mcg under tongue (four 200 mcg tabs)

Start emergency management

1 Check ABC's and give oxygen
2 Massage uterus
3 Give 10 IU oxytocin IM (or IV if in place)
4 Start IV Collect blood
5 Give TXA 1g in 10 mL over 10 minutes
6 Catheterize bladder
7 Apply NASG

DETERMINE CAUSE OF BLEEDING
Check if placenta is out and complete
Check for bleeding tears

MANAGE
If blood needed, transfuse early

Asses blood loss and status continuously

ATONIC UTERUS
Continue massage
Add 20 IU oxytocin to IV and infuse fast

Compress uterus

If still bleeding heavily

Compress aorta

Insert balloon tamponade

Seek advanced care

RETAINED PLACENTA/PARTS

Perform manual removal of the placenta

Placenta or parts not out
OR still bleeding heavily

Seek advanced care

BLEEDING TEARS

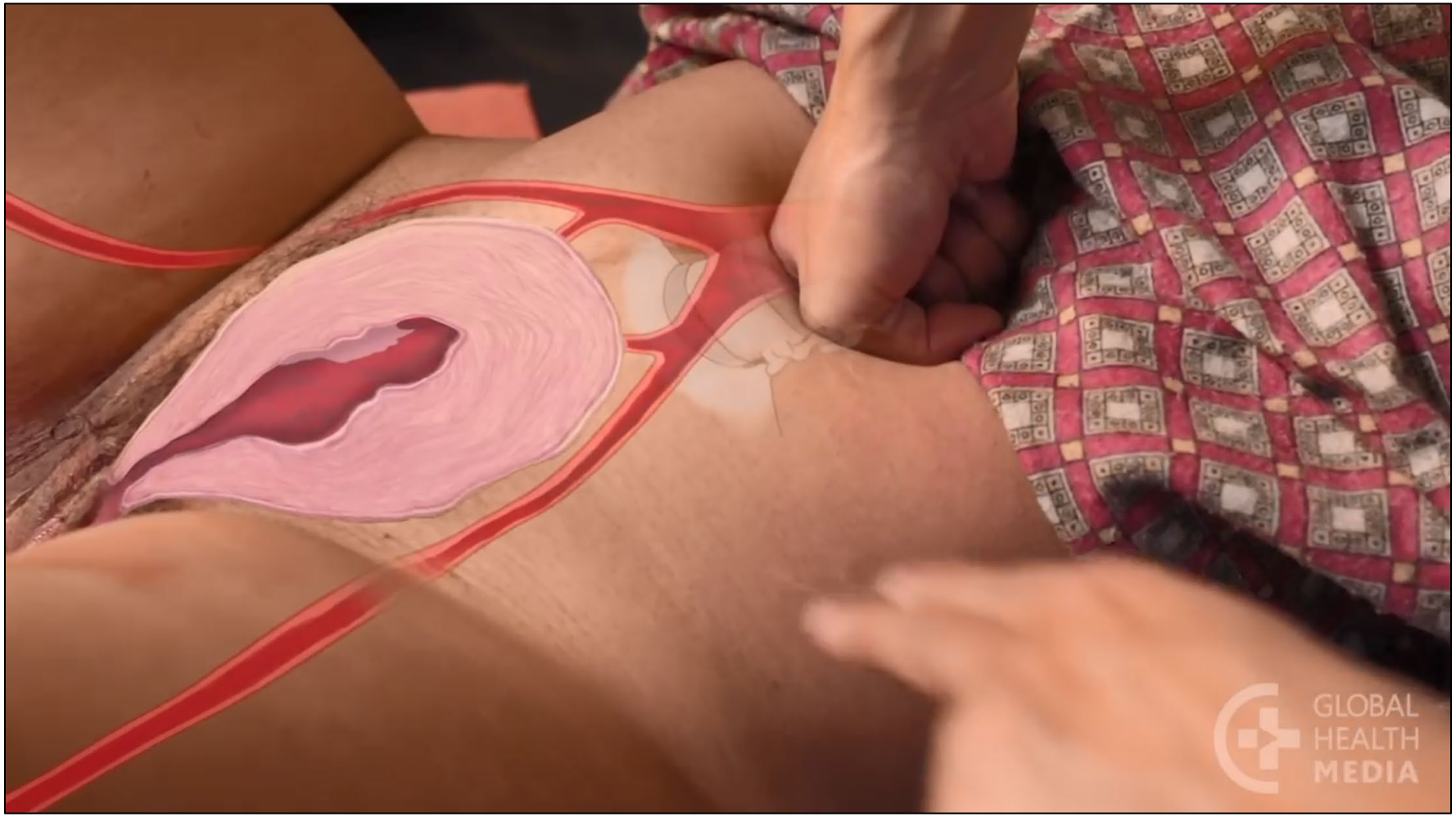
Inspect, identify

Repair

Placenta out and complete
Blood loss normal

Tear repaired
Blood loss normal

Continue care after PPH


GLOBAL
HEALTH
MEDIA

Krvácení
nebo těžké krvácení ?

500 ml = porodní asistentka
1000 ml = porodník
1500 ml = anesteziolog

What is postpartum haemorrhage?

tpartum haemorrhage (PPH) is the
ding cause of maternal death
ldwide.

partum haemorrhage (PPH) is
loss of 500 ml or more within 24 hours after birth.
ects about 5% of all women giving birth around the world.

ally, nearly one quarter of all maternal deaths are
ciated with PPH. In most low-income countries, it is the
cause of maternal mortality.

Poporodní krevní ztráta 500 ml a více

The majority of PPH-associated deaths could be avoided by the use of prophylactic uterotonics during the third stage of labour and appropriate treatment.

Improving health care for women during childbirth to prevent and treat PPH is a necessary step towards achievement of the health targets of the Sustainable Development Goals (SDGs).

99% of all maternal deaths occur in low- and middle-income countries (LMICs).

section 01

World Health Organization

human reproduction programme hrp research for impact

Proper Estimation of Blood Loss on Scene of Trauma: Tool or Tale?

Matthias Frank, MD, Uli Schmucker, MD, Dirk Stengel, MD, PhD, Lutz Fischer, MD, Joern Lange, MD, Rico Grossjohann, Dipl. Phys., Axel Ekkernkamp, MD, PhD, and Gerrit Matthes, MD, PhD

(*J Trauma.* 2010;69: 1191–1195)

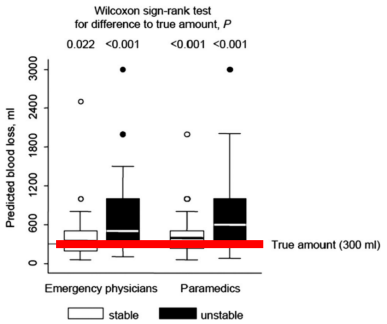


Figure 1. Estimation of blood loss by emergency physicians and paramedics for stable and unstable patients. Given *p* values indicate the statistical significance of the difference to the actual blood loss of 300 mL.

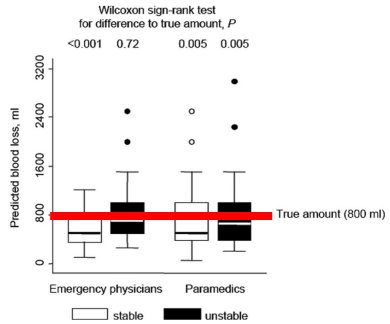


Figure 2. Estimation of blood loss by emergency physicians and paramedics for stable and unstable patients. Given *p* values indicate the statistical significance of the difference to the actual blood loss of 800 mL.

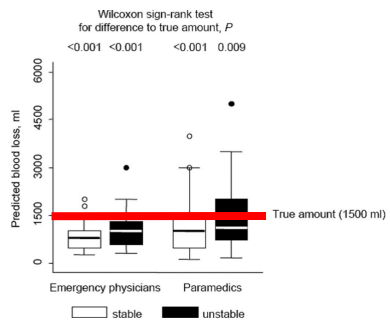


Figure 3. Estimation of blood loss by emergency physicians and paramedics for stable and unstable patients. Given *p* values indicate the statistical significance of the difference to the actual blood loss of 1,500 mL.

Frank M, *et al*. *J Trauma* 2010;69:1191–5

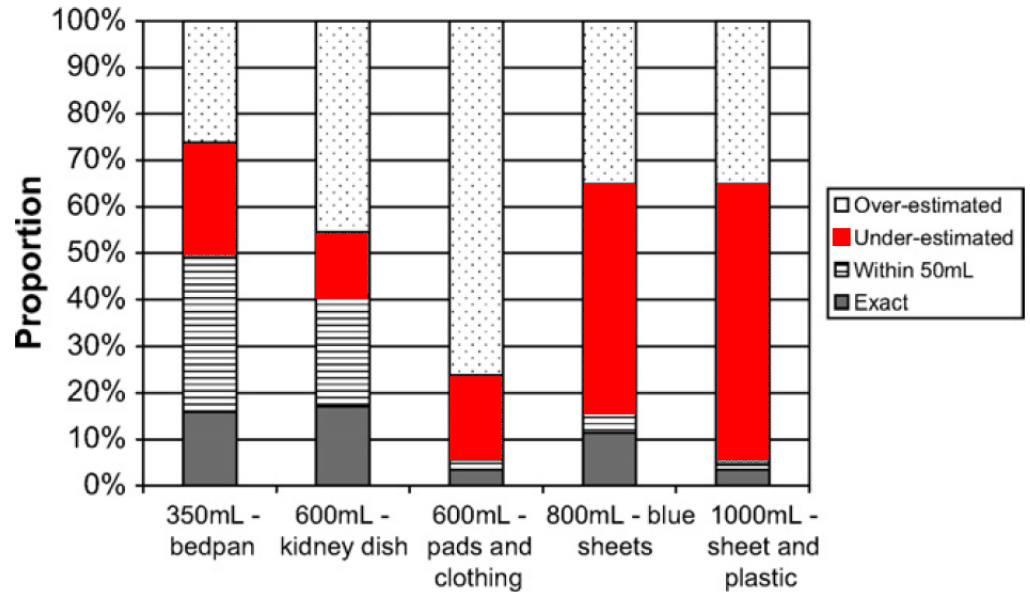


Fig. 2 Accuracy at each simulated clinical station: exact estimation, within 50 mL and over and underestimations (n = 88).

Buckland P et al. Women and Birth 2007; 20:85-88.

International Journal of Gynecology and Obstetrics (2006) 93, 220–224

Drape estimation vs. visual assessment for estimating postpartum hemorrhage

A. Patel [a,*], S.S. Goudar [b], S.E. Geller [c], B.S. Kodkany [b], S.A. Edlavitch [d], K. Wagh [b], S.S. Patted [b], V.A. Naik [b], N. Moss [e], R.J. Derman [d]

[a] *John H. Stroger Jr. Hospital of Cook County, Chicago, IL, USA*
[b] *J. N. Medical College, Belgaum, Karnataka, India*
[c] *Department of Obstetrics and Gynecology, University of Illinois at Chicago, Chicago, IL, USA*
[d] *University of Missouri at Kansas City School of Medicine, Kansas City, MO, USA*

Abstract

Objective: To compare (1) visual estimation of postpartum blood loss with estimation using a specifically designed blood collection drape and (2) the drape estimate with a measurement of blood loss by photospectrometry. *Methods*: A randomized controlled study was performed with 123 women delivered at the District Hospital, Belgaum, India. The women were randomized to visual or drape estimation of blood loss. A subsample of 10 drape estimates was compared with photospectrometry results. *Results*: The visual estimate of blood loss was 33% less than the drape estimate. The interclass correlation of the drape estimate to photospectrometry measurement was 0.92. *Conclusion*: Drape estimation of blood loss is more accurate than visual estimation and may have particular utility in the developing world. Prompt detection of postpartum hemorrhage may reduce maternal morbidity and mortality in low-resource settings.

Figure 1 The BRASS-V Drape, a specially designed blood collection drape with a calibrated collection pouch.

Table 1 Distribution of blood loss between study groups

	Visual group, $n = 61$	Drape group, $n = 62$
Blood loss, mean ± S.D. (range) (mL)	203.11 ± 147.49 (50–950)*	302.82 ± 173.28 (50–975)

*$P = 0.0008$.

Diaz V, *et al. Cochrane Database Syst Rev* 2018;9:CD010980

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Analysis 1.2. Comparison 1 Direct estimation using calibrated drapes versus visual estimation, Outcome 2 Blood transfusion.

Study or subgroup	Calibrated drapes n/N	Visual estimation n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
Zhang 2010	19/2418	30/3143		100%	0.82[0.46,1.46]
Total (95% CI)	**2418**	**3143**		**100%**	**0.82[0.46,1.46]**
Total events: 19 (Calibrated drapes), 30 (Visual estimation)					
Heterogeneity: Not applicable					
Test for overall effect: Z=0.67(P=0.51)					

TRF

Favours calibrated drapes 0.01 0.1 1 10 100 Favours visual estimation

Analysis 1.3. Comparison 1 Direct estimation using calibrated drapes versus visual estimation, Outcome 3 Use of plasma expander.

Study or subgroup	Calibrated drapes n/N	Visual estimation n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
Zhang 2010	16/1358	27/1764		100%	0.77[0.42,1.42]
Total (95% CI)	**1358**	**1764**		**100%**	**0.77[0.42,1.42]**
Total events: 16 (Calibrated drapes), 27 (Visual estimation)					
Heterogeneity: $Tau^2=0$; $Chi^2=0$, df=0(P<0.0001); $I^2=100\%$					
Test for overall effect: Z=0.83(P=0.4)					

Favours calibrated drapes 0.01 0.1 1 10 100 Favours visual estimation

Analysis 1.4. Comparison 1 Direct estimation using calibrated drapes versus visual estimation, Outcome 4 Use of therapeutic uterotonics.

Study or subgroup	Calibrated drapes n/N	Visual estimation n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
Zhang 2010	12/258	18/335		100%	0.87[0.42,1.76]
Total (95% CI)	**258**	**335**		**100%**	**0.87[0.42,1.76]**
Total events: 12 (Calibrated drapes), 18 (Visual estimation)					
Heterogeneity: Not applicable					
Test for overall effect: Z=0.4(P=0.69)					

uterotonika

Favours calibrated drapes 0.01 0.1 1 10 100 Favours visual estimation

MEZIOBOROVÝ DOPORUČENÝ POSTUP

DIAGNOSTIKA A LÉČBA PERIPARTÁLNÍHO ŽIVOT OHROŽUJÍCÍHO KRVÁCENÍ

Česko-slovenský mezioborový konsenzus

Pařízek A.[1], Binder T.[2], Bláha J.[3], Blatný J.[4], Buršík M.[5], Feyereisl J.[6], Janků P.[7], Kokrdová Z.[1], Křepelka P.[6], Kvasnička J.[8], Lubušký M.[9], Seidlová D.[10], Šimetka O.[11,12], Štourač P.[13], Černý V.[14–17]

3.2 DEFINICE

Peripartální krvácení lze definovat a rozdělit podle odhadu velikosti krevní ztráty:

- **„méně závažná“** krevní ztráta (do 1000 ml),
- **„závažná“** krevní ztráta (nad 1000 ml),
- **„peripartální život ohrožující krvácení“** je definováno jako rychle narůstající krevní ztráta, která je klinicky odhadnuta nad 1500 ml, nebo jako jakákoliv krevní ztráta spojená s rozvojem klinických a/nebo laboratorních známek šoku/tkáňové hypoperfuze.

What is postpartum haemorrhage?

Postpartum haemorrhage (PPH) is the leading cause of maternal death worldwide.

Postpartum haemorrhage (PPH) is [illegible] blood loss of 500 ml or more within 24 hours after birth.
It affects about 5% of all women giving birth around the world.

Globally, nearly one quarter of all maternal deaths are associated with PPH. In most low-income countries, it is the main cause of maternal mortality.

Poporodní krevní ztráta 500 ml a více

The majority of PPH-associated deaths could be avoided by the use of prophylactic uterotonics during the third stage of labour and appropriate treatment.

Improving health care for women during childbirth to prevent and treat PPH is a necessary step towards achievement of the health targets of the Sustainable Development Goals (SDGs).

99% of all maternal deaths occur in low- and middle-income countries (LMICs).

section 01

World Health Organization

human reproduction programme hrp research for impact

Assessing reVITALize: Should the Definition of Postpartum Hemorrhage Differ by Mode of Delivery?

Rebecca Feldman Hamm, MD[1] Eileen Y. Wang, MD[1] Jamie A. Bastek, MD, MSCE[1] Sindhu K. Srinivas, MD, MSCE[1]

[1] Department of Obstetrics and Gynecology, Maternal and Child, University of Pennsylvania, Perelman School of Medicine, Philadelphia, Pennsylvania

Abstract

Background Obstetrical hemorrhage is a leading cause of morbidity and mortality, yet is inconsistently defined. In 2014, the American Congress of Obstetricians and Gynecologists (ACOG) reVITALize program redefined postpartum hemorrhage (PPH) as greater than 1,000 mL blood loss regardless of the mode of delivery (MOD).

Objective We sought to assess the reVITALize definition's validity by understanding whether the definition of PPH should, as proposed by ACOG, be one value regardless of MOD.

Study Design This is a retrospective study of all women who delivered at the hospital of the University of Pennsylvania from October 15, 2013 through December 15, 2013.

Results A total of 592 of the 626 (95%) women were included. The average reported estimated blood loss (EBL) for vaginal delivery (VD) was significantly lower than for cesarean delivery (CD) ([350 ±170 mL) and [880 ± 360 mL]; $p < 0.001$). The average hemoglobin (Hb) drop was only slightly lower for VD compared with CD ([1.4 ± 1.0 g/dL [11.5% drop]] and [1.9 ± 1.2 g/dL [16.2% drop]], respectively, $p < 0.001$). The association between EBL and observed Hb drop differed in accuracy by MOD.

Conclusion Likely based on historic perceptions, obstetric providers estimate blood loss for VD as less than half that of CD. However, using objective measures, blood loss is more similar than perceived between VD and CD, supporting the ACOG reVITALize single definition of PPH regardless of MOD.

Keywords

- postpartum hemorrhage
- estimated blood loss
- reVITALize
- blood transfusion

Table 2 Expected and actual hemoglobin drop by mode of delivery

Mode of delivery	Mean reported EBL (mL)	Mean expected Hb drop based on EBL	Mean actual Hb drop
SVD ($N = 411$)	350	0.7	1.4
OVD ($N = 19$)	420	0.8	2.4
CD ($N = 188$)	880	1.8	1.9

Abbreviations: CD, cesarean delivery; EBL, estimated blood loss; Hb, hemoglobin; OVD, operative vaginal delivery; SVD, spontaneous vaginal delivery.

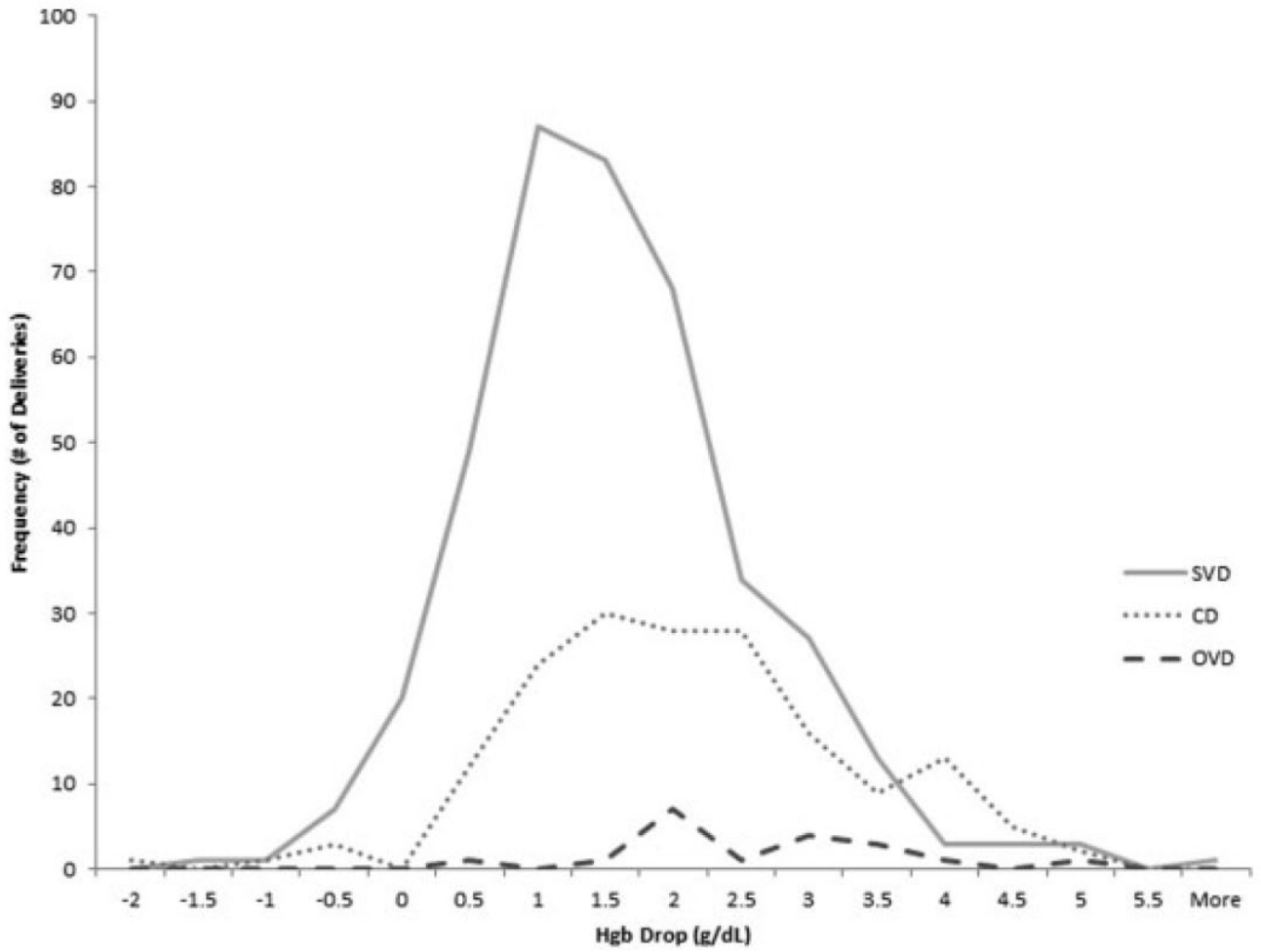
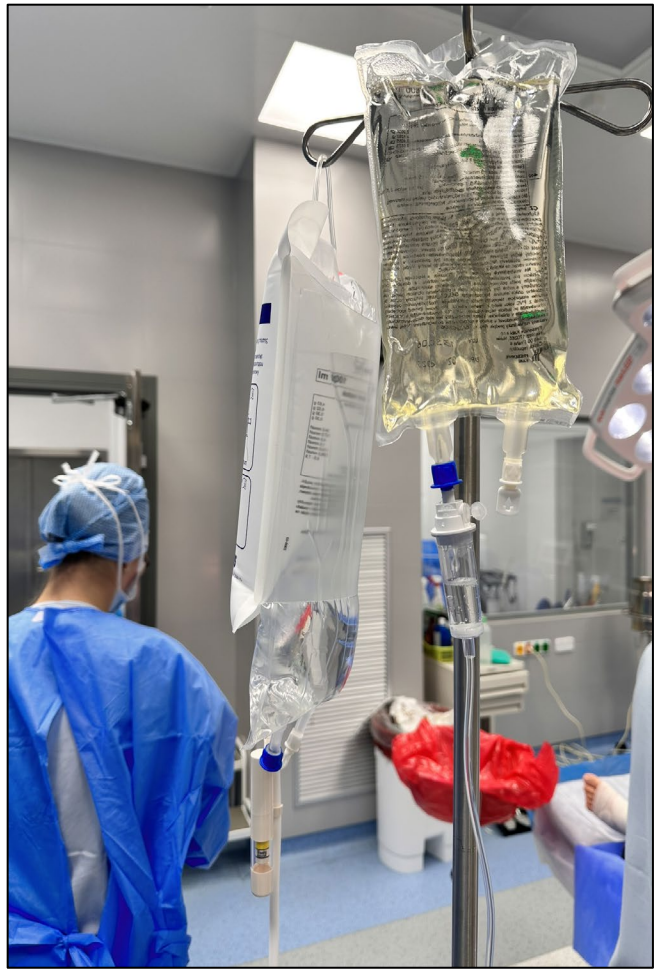


Fig. 1 Histogram depicting hemoglobin drop in g/dL by MOD. CD, cesarean delivery; MOD, mode of delivery. OVD, operative vaginal delivery; SVD, spontaneous vaginal delivery

Feldmann Hamm R, *et al*. *Am J Perinatol* 2017;34:503–7

Kritické stavy jsou aplikovaná patofyziologie !

KRYSTALOIDY NEBO KOLOIDY?



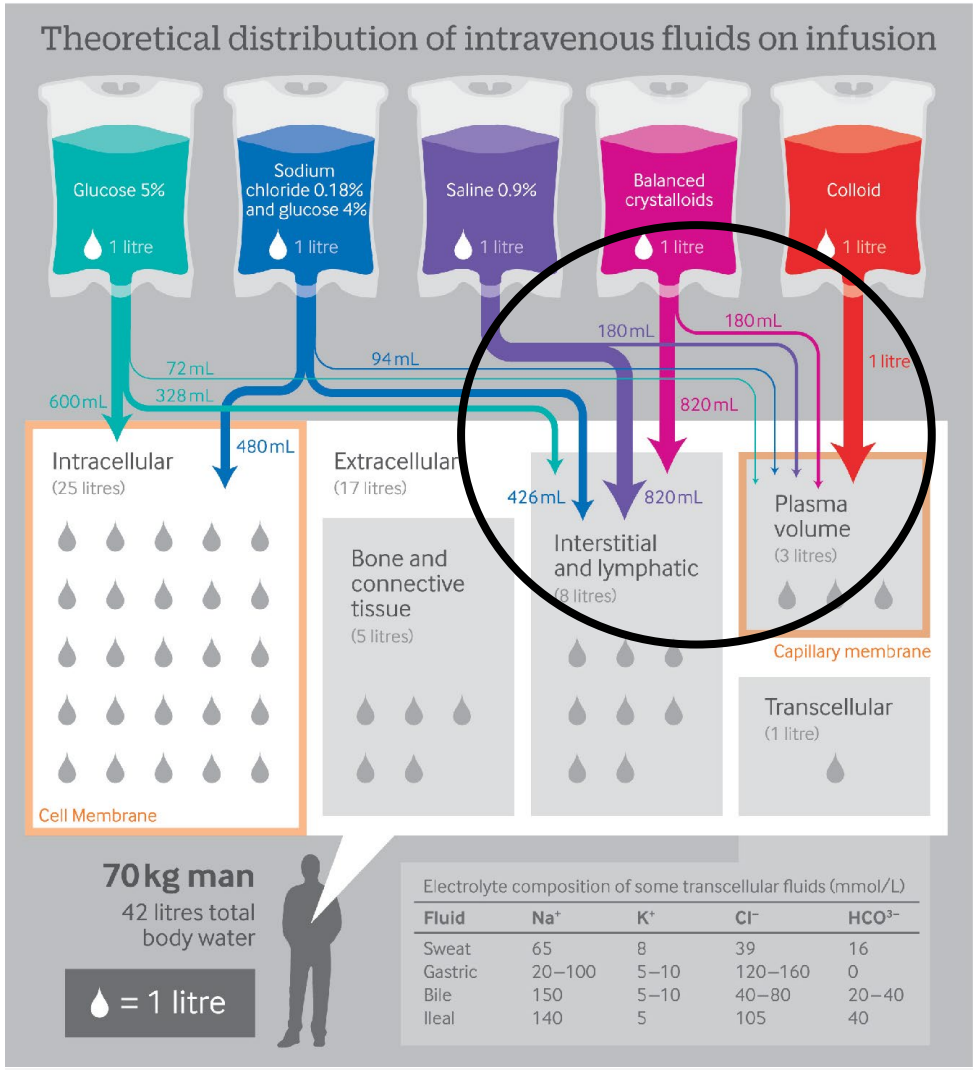


Fig 1 Body fluid compartment volumes and theoretical distribution of intravenous fluids in healthy people

Frost. BMJ 2014;350:g7620 doi: 10.1136/bmj.g7620

JOURNAL OF SURGICAL RESEARCH 185 (2013) 294–299

Initial assessment on the impact of crystalloids *versus* colloids during damage control resuscitation

Chrissy Guidry, DO,[a,b] *Elizabeth Gleeson, MD, MPH,*[a,c] *Eric R. Simms, MD,*[a] *Lance Stuke, MD, MPH,*[d] *Peter Meade, MD, MPH,*[a] *Norman E. McSwain Jr, MD,*[a] *and Juan C. Duchesne, MD*[a,*]

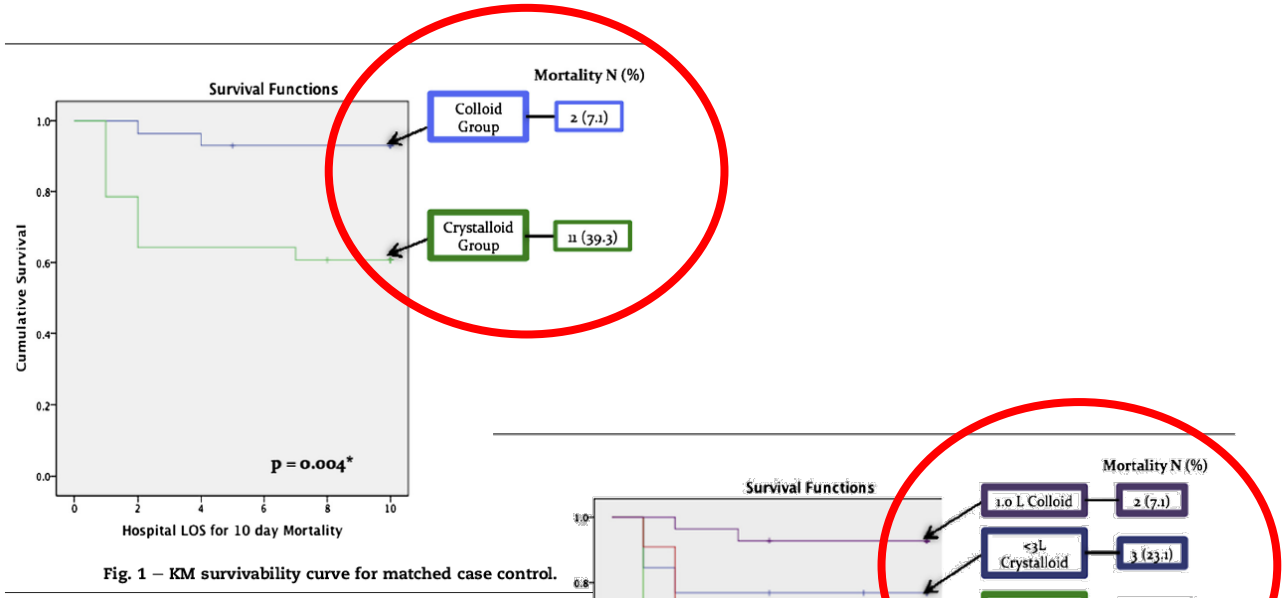


Fig. 1 – KM survivability curve for matched case control.

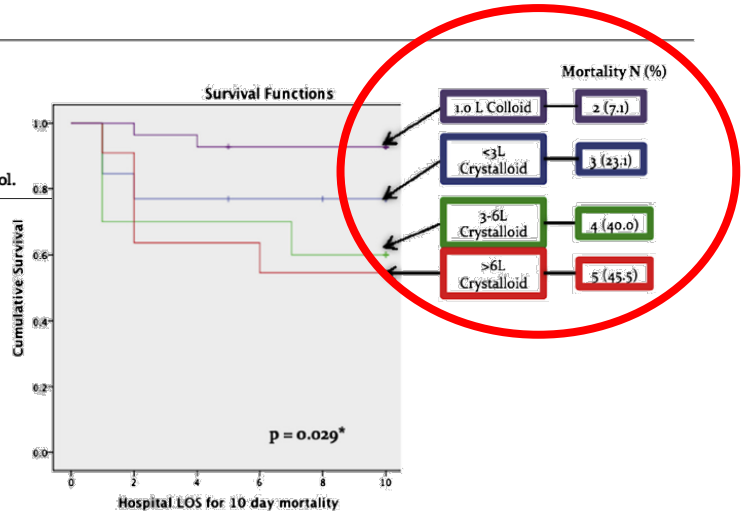
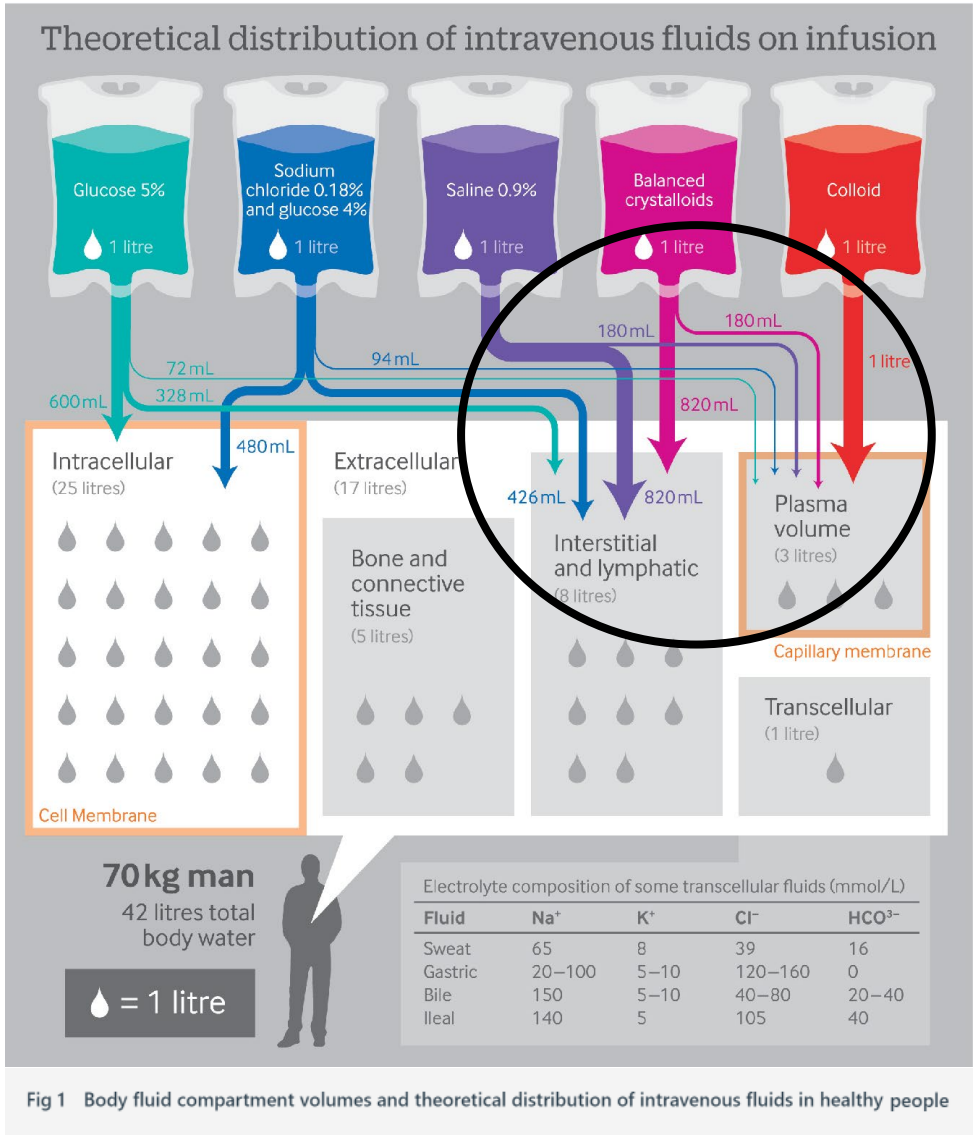


Fig. 2 – Kalpan-Meier curve, 10-d mortality, survivability for subgroup quantity analysis.



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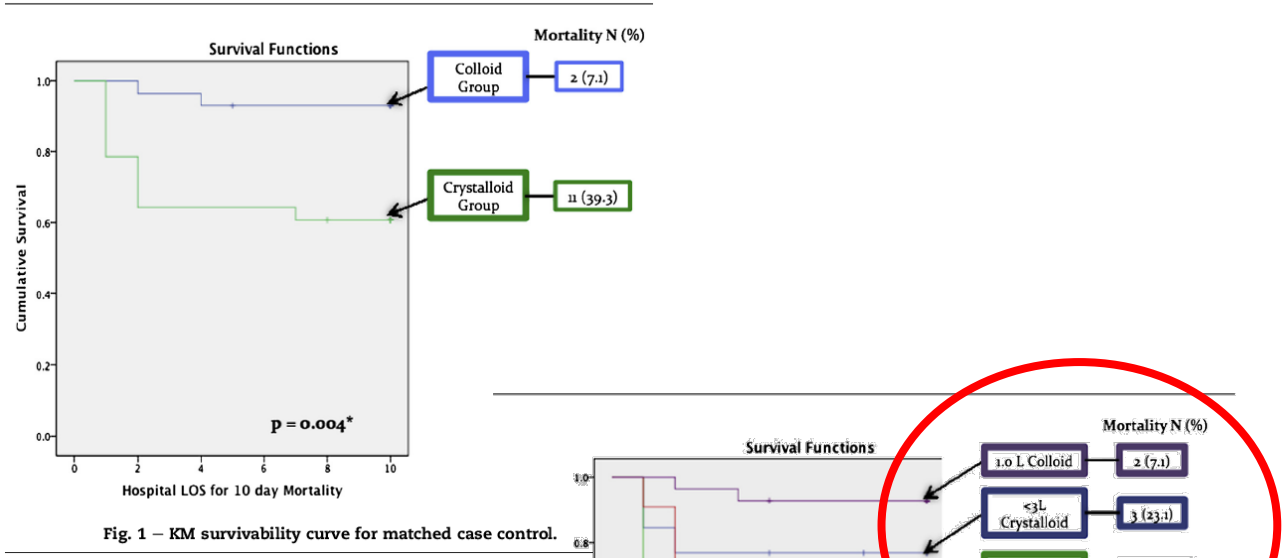


Fig. 1 – KM survivability curve for matched case control.

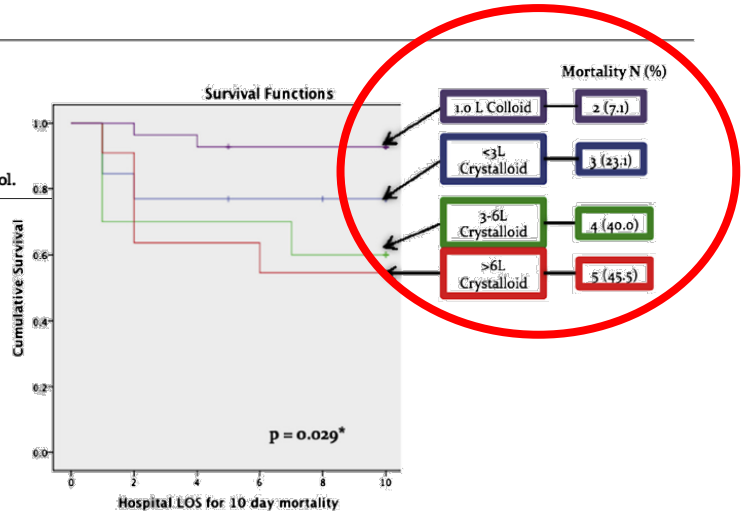


Fig. 2 – Kalpan-Meier curve, 10-d mortality, survivability for subgroup quantity analysis.

Endotel a glykokalyx matters !

Zdraví

Hemoragický šok

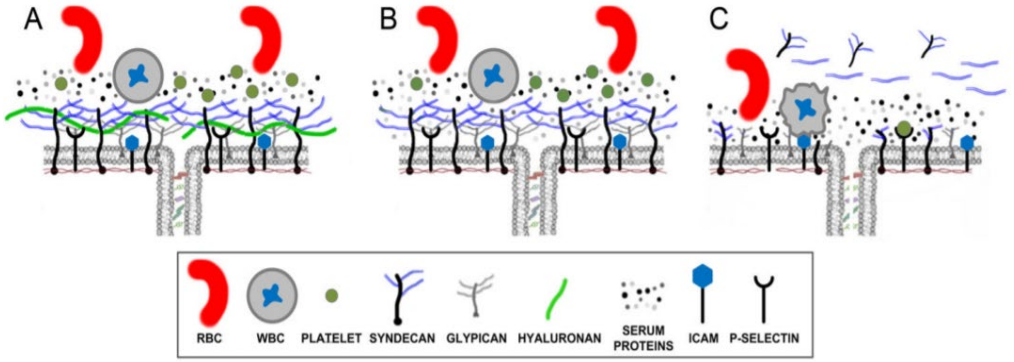


Figure 1.
A) An intact endothelial glycocalyx provides a barrier between the plasma compartment and the cell membrane and limits RBC, WBC and platelets from contacting the cell surface. The glycocalyx and associated immobile protein layer overlies the cell junction contributing to endothelial barrier properties for both water and protein flux. **B)** During mild to moderate inflammation, shedding and proteolytic cleavage of the glycocalyx (in this case removal of hyaluronan) increases the porosity of the glycocalyx. **C)** During severe inflammation and trauma, breakdown of the glycocalyx exposes ICAM and P-selectin resulting in increased WBC and platelet adhesion, respectively, and propagation of the inflammatory response. Note the presence of shed syndecans and heparan sulfates in the plasma that are hypothesized to contribute to auto-heparinization and the coagulopathy of trauma (see text for detail).

Chignalia. Shock. 2016 April ; 45(4): 338–348

EJA

Eur J Anaesthesiol 2023; **40**:226–304

GUIDELINES

Management of severe peri-operative bleeding: Guidelines from the European Society of Anaesthesiology and Intensive Care

Second update 2022

2.9 Intra-operative transfusion triggers and volume management

Recommendation 15

We recommend a target Hb concentration of 7 to 9 g dl^{-1} during active bleeding. 1B

We recommend [illegible] losses with isotonic crystalloids in [illegible] based manner. 1B

Compared with crystalloids, macro-haemodynamic and micro-haemodynamic stabilisation can be achieved with less volume of iso-oncotic colloids, and less tissue oedema. C

Mikro i makro-hemodynamické stability lze s koloidy dosáhnout snadněji a s menším tkáňovým edémem

Meta-analysis of colloids *versus* crystalloids in critically ill, trauma and surgical patients

S. H. Qureshi[1], S. I. Rizvi[2], N. N. Patel[3] and G. J. Murphy[1]

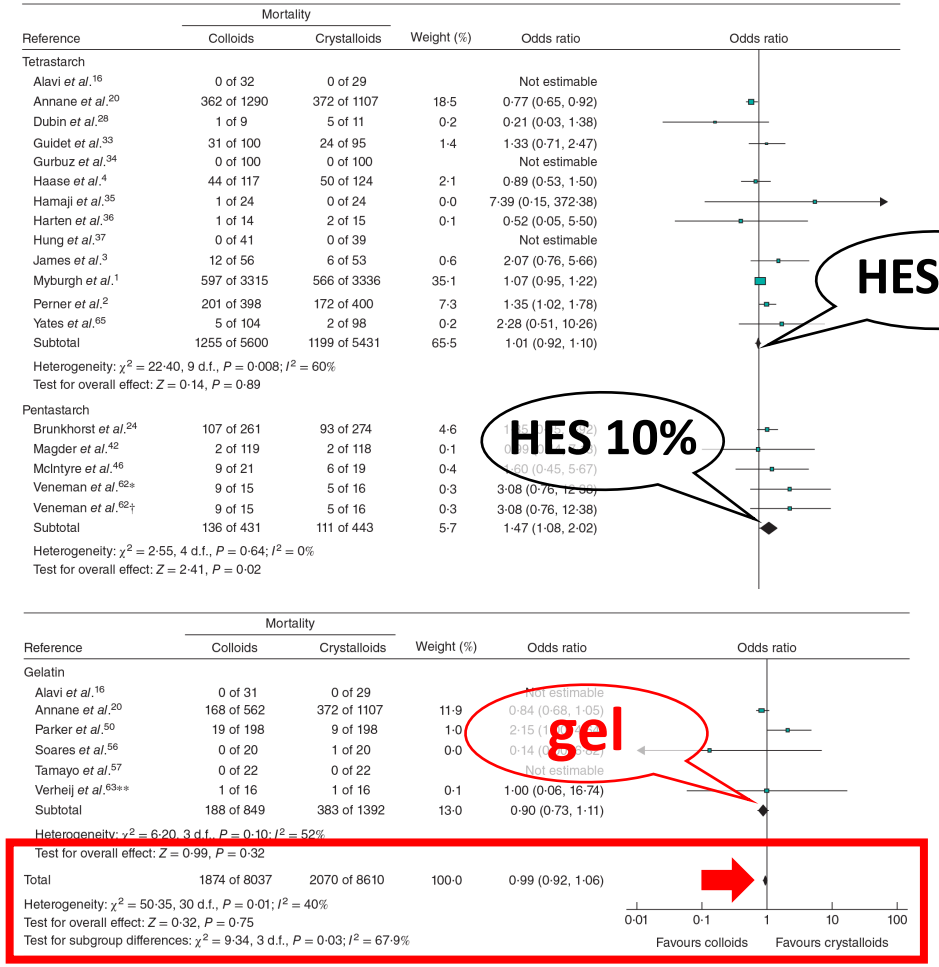
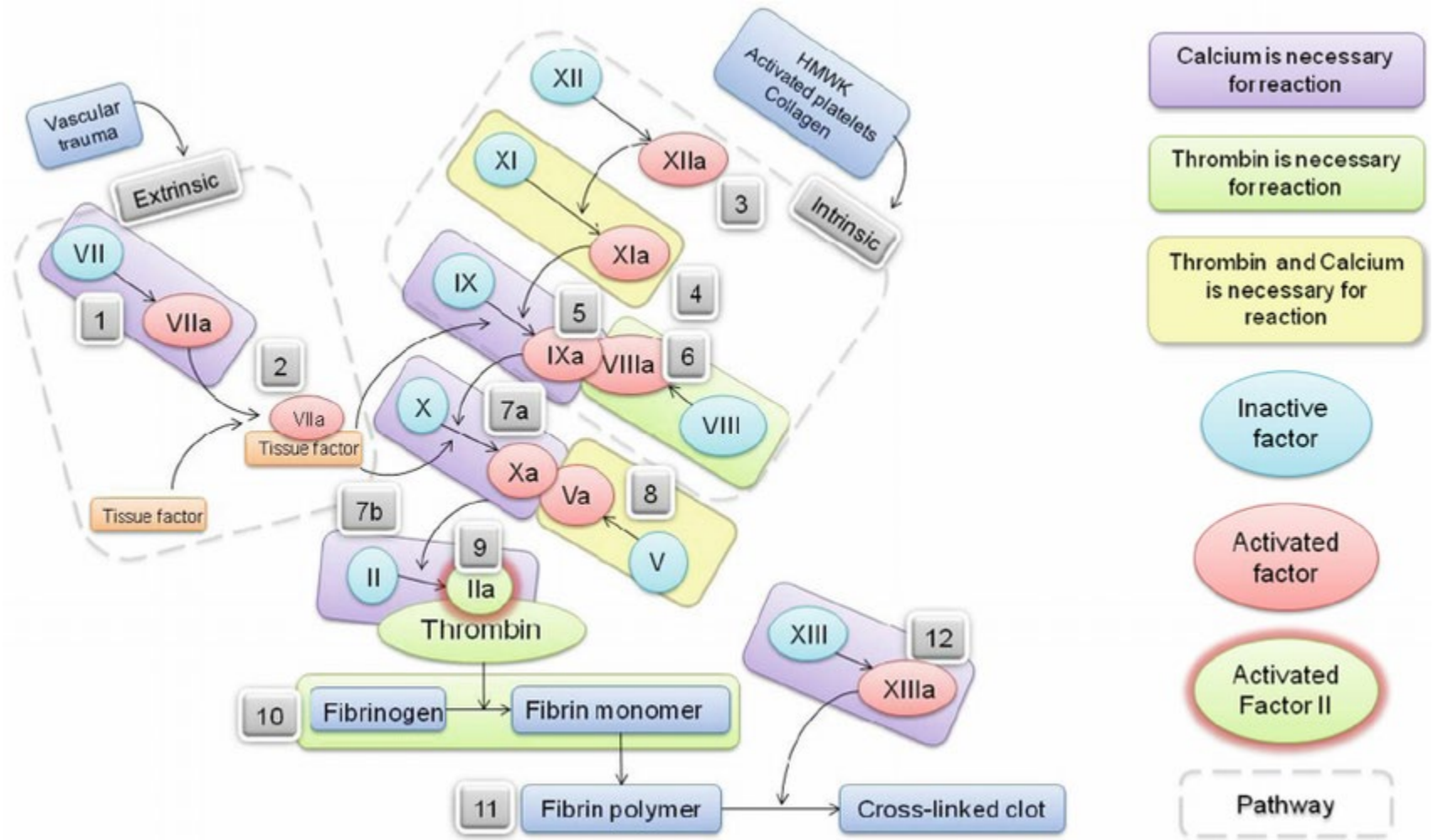
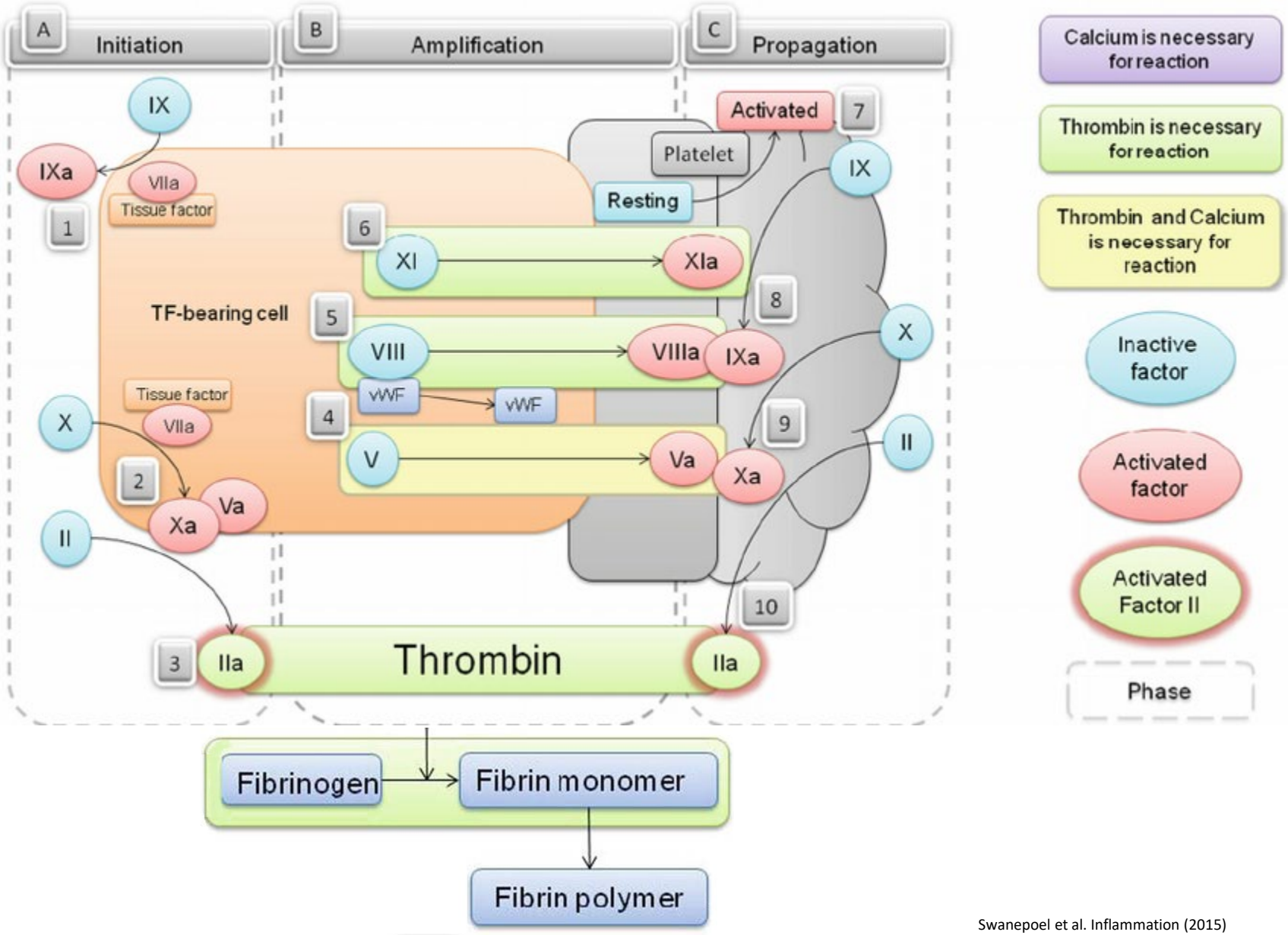


Fig. 2 Continued



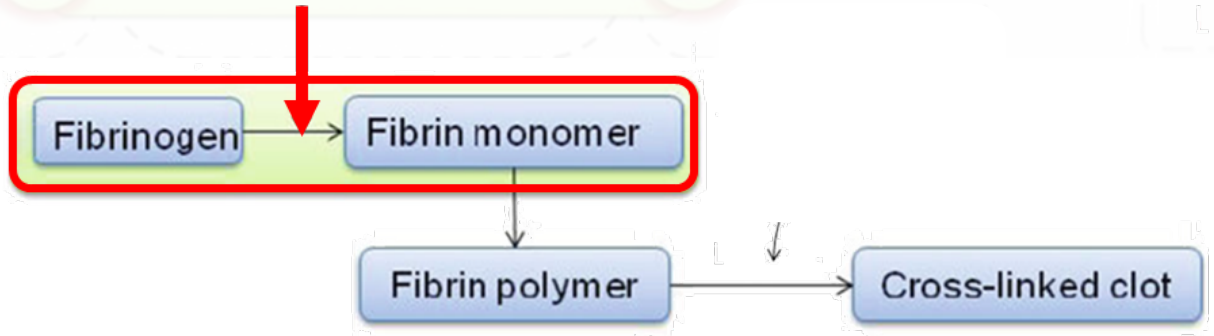
Swanepoel et al. Inflammation (2015)



Swanepoel et al. Inflammation (2015)

U masivního krvácení je fibrinogen prvním faktorem, který dosáhne kriticky nízké hladiny!

Brenni M, et al. Acta Anaesthesiol Scand. 2010;54:111-117



U masivního krvácení je fibrinogen prvním faktorem, který dosáhne kriticky nízké hladiny!

významná změna při poklesu fibrinogenu pod 25% normální hladiny

Table 2

FI concentration–response via thrombelastography.

mg dl^{-1}	R	α
75	237 (198–261)	33.6 (32.4–34.8)
100	156 (141–168)*	49.4 (46.2–53.2)*
150	144 (138–159)*	63.2 (60.7–65.6)*†
200	138 (135–156)*	71.6 (70.2–74.0)*†‡
250	132 (126–144)*	75.8 (75.3–76.9)*†‡ §
300	141 (135–147)*	78.6 (77.9–79.9)*†‡§¶
345	156 (141–165)*	79.8 (78.4–80.4)*†‡§¶

Values are expressed as median (1st–3rd quartiles).
All conditions were the results of eight separate experiments.
*$P < 0.05$ vs. 75 mg dl^{-1},
†$P < 0.05$ vs. 100 mg dl^{-1},
‡$P < 0.05$ vs. 150 mg dl^{-1},
§$P < 0.05$ vs. 200 mg dl^{-1},
¶$P < 0.05$ vs. 250 mg dl^{-1}.

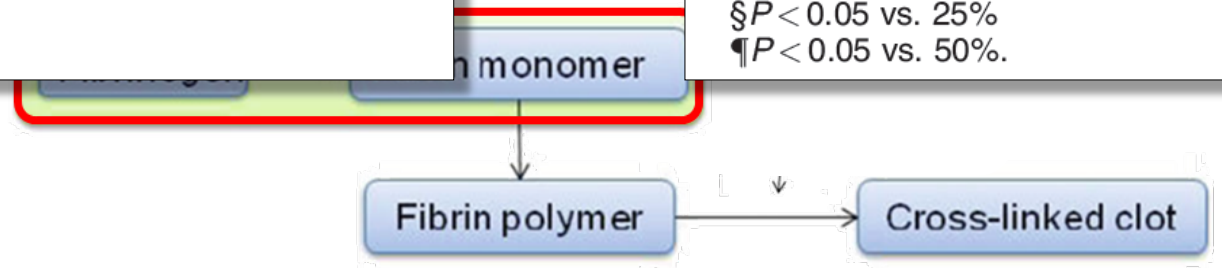
významná změna při poklesu trombinu pod 5% aktivity

Table 3

FII activity–response via thrombelastography.

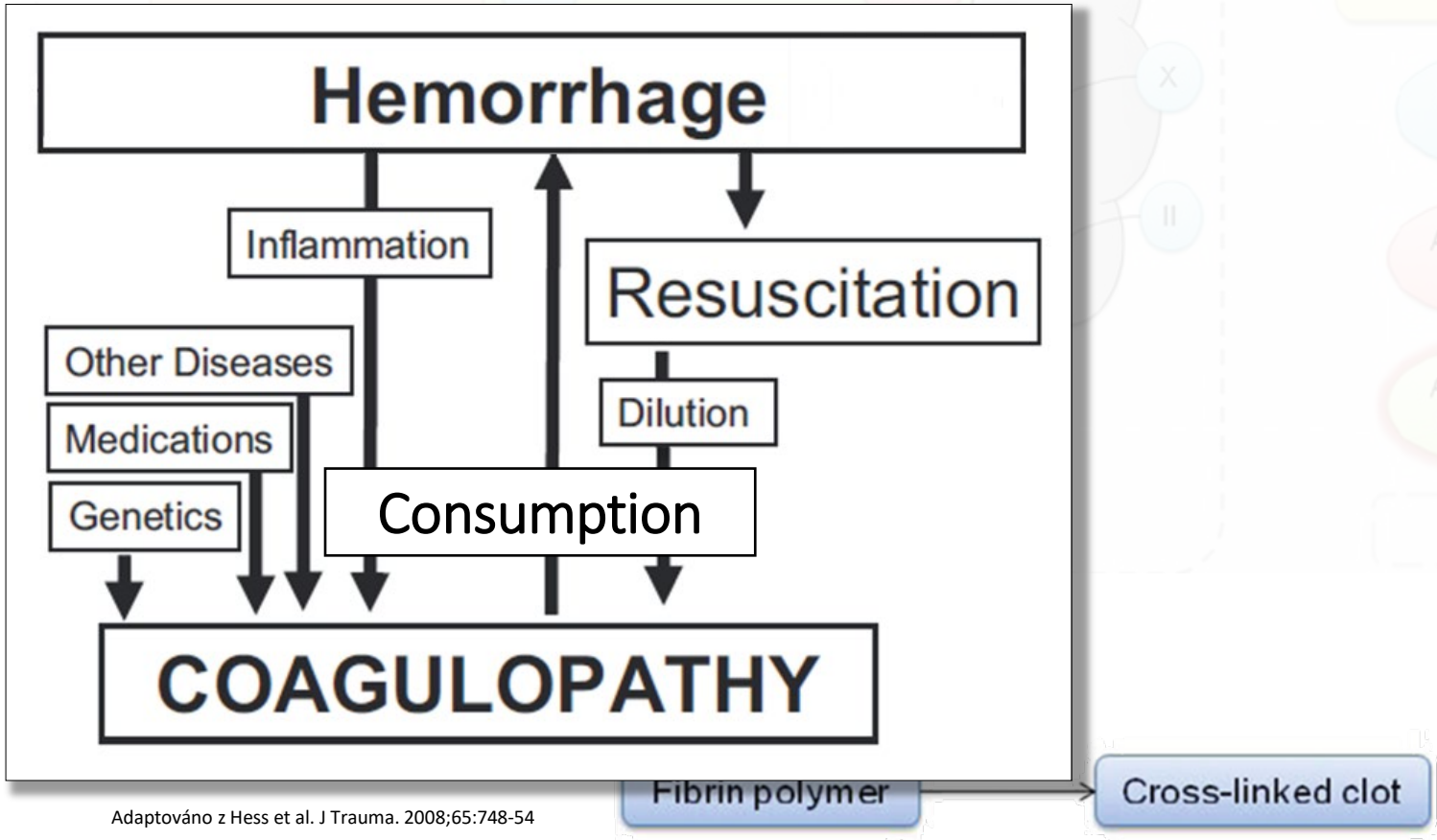
%	R	α
1	297 (279–318)	56.6 (55.8–58.4)
6.25	144 (138–156)*	67.3 (65.2–69.2)*
12.5	141 (129–144)*†	67.4 (66.2–69.4)*
25	129 (120–138)*†	72.2 (67.9–72.5)*
50	138 (123–144)*†	75.8 (74.7–77.0)*†‡§
100	156 (141–165)*†‡§¶	79.8 (78.4–80.4)*†‡§¶

Values are expressed as median (1st–3rd quartiles).
All conditions were the results of eight separate experiments.
*$P < 0.05$ vs. 1%,
†$P < 0.05$ vs. 6.25%,
‡$P < 0.05$ vs. 12.5%,
§$P < 0.05$ vs. 25%
¶$P < 0.05$ vs. 50%.



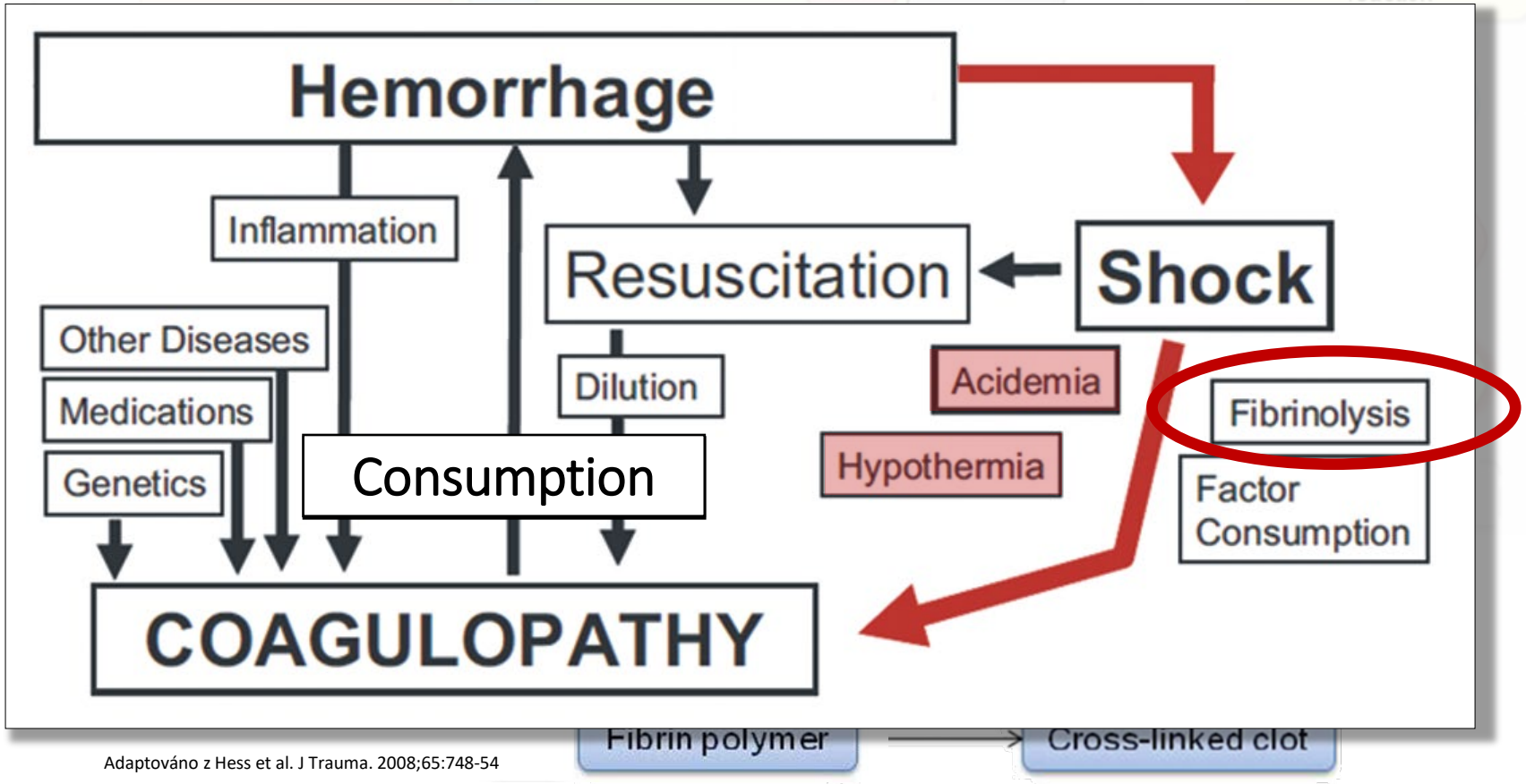
Nielsen VG et al. Acta Anaesthesiol Scand. 2005 Feb;49(2):222-31

U masivního krvácení je fibrinogen prvním faktorem, který dosáhne kriticky nízké hladiny!



Adaptováno z Hess et al. J Trauma. 2008;65:748-54

U masivního krvácení je fibrinogen prvním faktorem, který dosáhne kriticky nízké hladiny!



Adaptováno z Hess et al. J Trauma. 2008;65:748-54

Effect of early tranexamic acid administration on mortality, hysterectomy, and other morbidities in women with post-partum haemorrhage (WOMAN): an international, randomised, double-blind, placebo-controlled trial

Published Online
April 26, 2017
http://dx.doi.org/10.1016/S0140-6736(17)30638-4

*WOMAN Trial Collaborators**

Summary

Background Post-partum haemorrhage is the leading cause of maternal death worldwide. Early administration of tranexamic acid reduces deaths due to bleeding in trauma patients. We aimed to assess the effects of early administration of tranexamic acid on death, hysterectomy, and other relevant outcomes in women with post-partum haemorrhage.

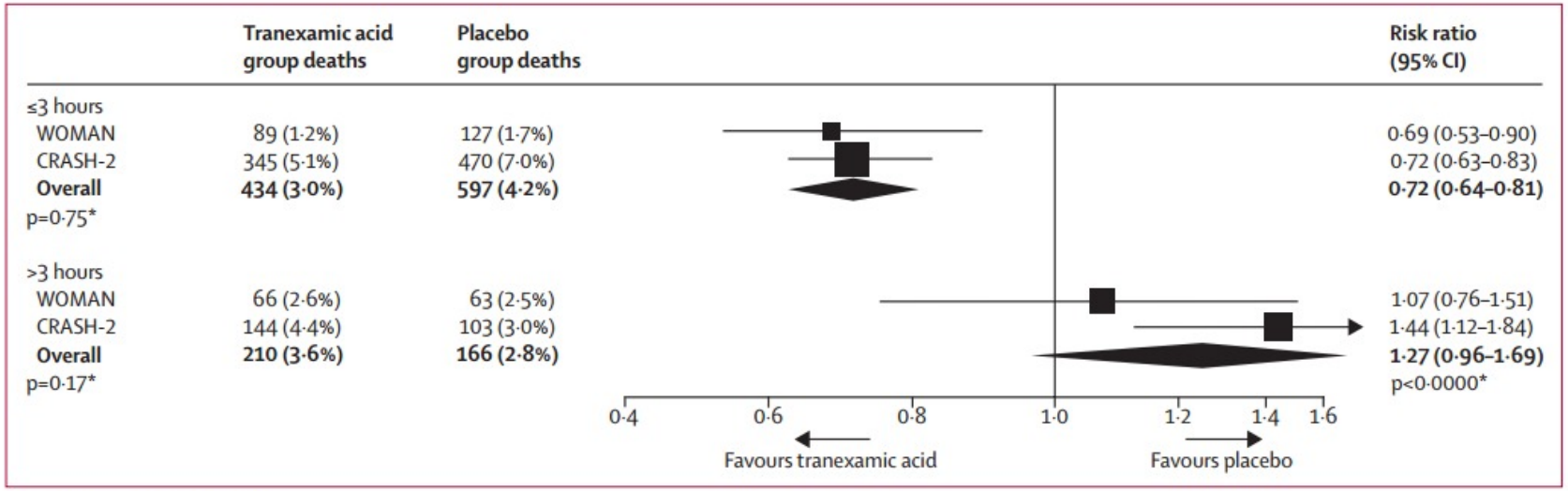


Figure 5: **Time to treatment**
*Heterogeneity p value.

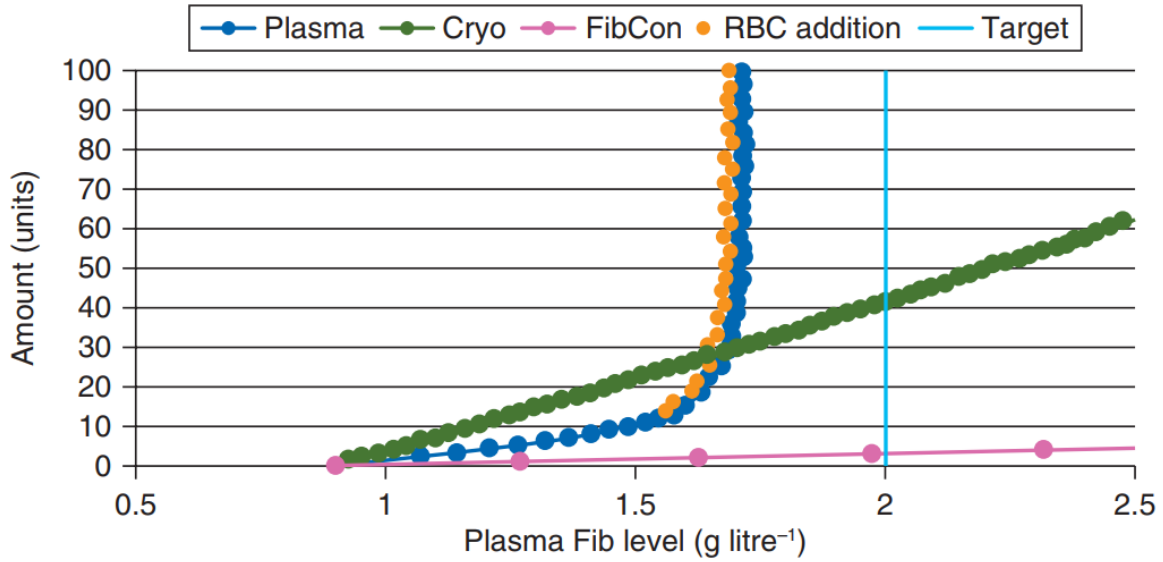
British Journal of Anaesthesia 113 (4): 585–95 (2014)

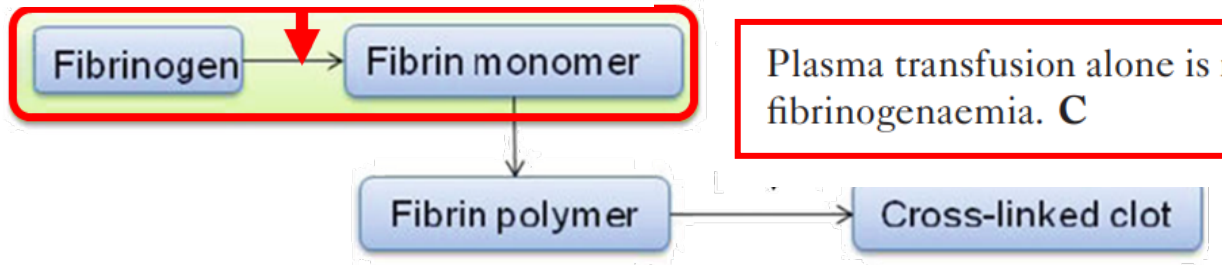
BJA

Theoretical modelling of fibrinogen supplementation with therapeutic plasma, cryoprecipitate, or fibrinogen concentrate

P. W. Collins[1*], C. Solomon[2,3], K. Sutor[4], D. Crispin[4], G. Hochleitner[5], S. Rizoli[6], H. Schöchl[7,8], M. Schreiber[9] and M. Ranucci[10]

Fib level graph





EJA

Eur J Anaesthesiol 2017; 34:332–395

GUIDELINES

Management of severe perioperative bleeding: guidelines from the European Society of Anaesthesiology

First update 2016

EJA

Eur J Anaesthesiol 2023; 40:226–304

GUIDELINES

Management of severe peri-operative bleeding: Guidelines from the European Society of Anaesthesiology and Intensive Care

Second update 2022

1.7. General coagulation management

Fibrinogen concentration of less than 1.5 to 2 g l^{-1} is considered as hypofibrinogenaemia in acquired coagulopathy and is associated with increased bleeding risk. **C**

We recommend treatment of hypofibrinogenaemia in bleeding patients. **1C**

Plasma transfusion alone is not sufficient to correct hypofibrinogenaemia. **C**

The different types of coagulopathy

většinou spojeno s šokem

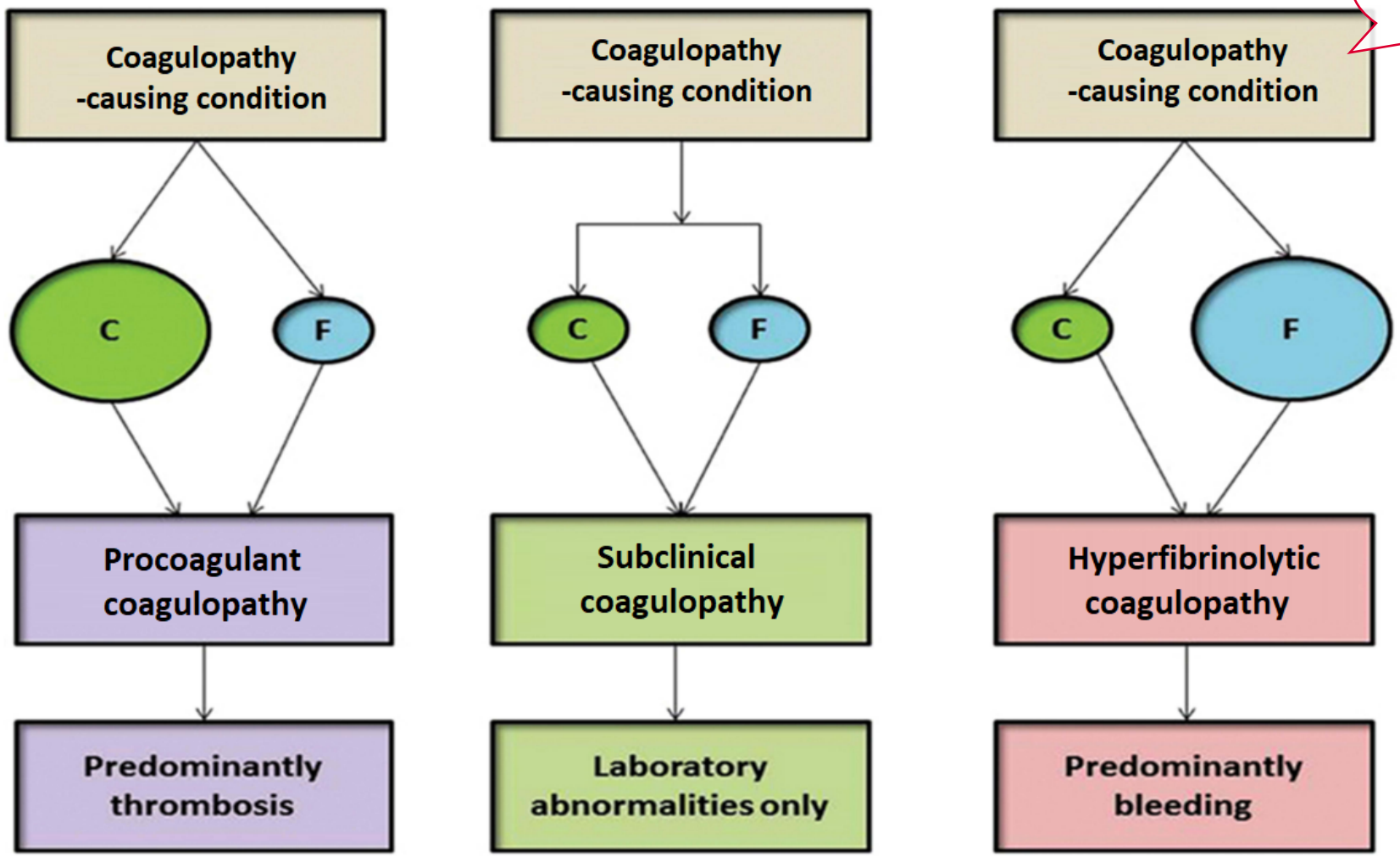
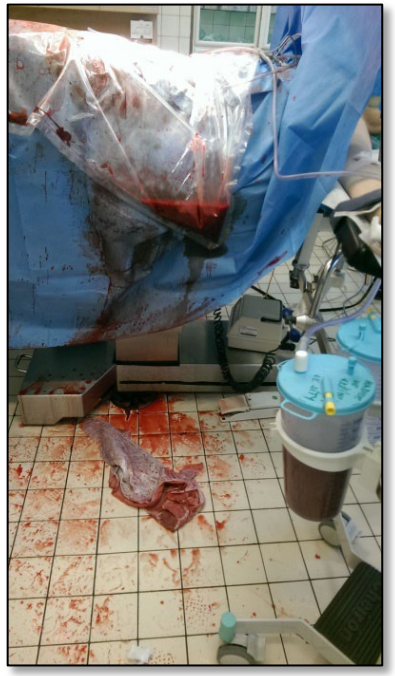
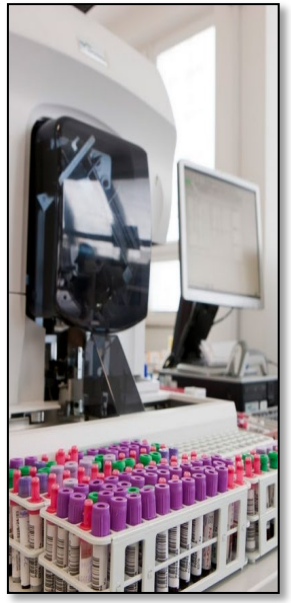


Figure 1 The different types of coagulopathy and their clinical presentation. If there is predominance of coagulation pathway activation (denoted as C), in comparison with the fibrinolytic pathways (denoted as F), procoagulant coagulopathy is the result. While the reverse leads to hyperfibrinolytic coagulopathy.
Adapted from: *Thachil J. The Elusive Diagnosis of Disseminated Intravascular Coagulation: does a Diagnosis of DIC Exist Anymore? Semin Thromb Hemost. 2019;45:100–107.24*


REMEMBER
TIME LOST
CANNOT BE
REGAINED





.Výsledky: [redacted] (82[redacted])

Režim Mixer Data Zobrazení Filtry Typy událostí Potvrzování Zpřístupňování Konfigurace

Třídy a metody	28/06/11 11:49	28/06/11 12:01	28/06/11 12:03	28/06/11 12:31
Diabetický profil				
Glukóza	8,3 ^			
ABR - krev				
Hemoglobin	63			
pH	7,306			
PCO2	5,04			
HCO3 aktuální	18,3			
HCO3 standardní	18,8			
Base excess aktuální	-6,8			
PO2	30,0			
O2 saturovaný	98,9			
CO2 celkový	18,1			
Typ krve	Arterial			
Plná krev				
Laktát			2,80	
Sodík			126	
Draslík			5,0	
Chloridy			108	
Vápník ionizovaný			0,62	
Krevní obraz-perifer				
Leukocyty		8,20		
Erytrocyty		2,74		
Hemoglobin		80		
Hematokrit		0,245		
Stř.obj.erytr.		89,4		
Barvivo erytr.		29,2		
Stř.barev.kon.		327		
Distr.křiv.ery		14,8		
Trombocyty		69		
Stř.obj.trombo		10,3		
Destičkový hematokrit		0,070		
Distr.křiv.tr.		18,9		
Koagulační vyšetření				
Quickův test INR				1,05
APTT				30,3
Trombinový čas				17,1
Fibrinogen koagul.				2,7
Etanol gelifik.test				Txt+His
Antitrombin III				78
D-dimery				1830

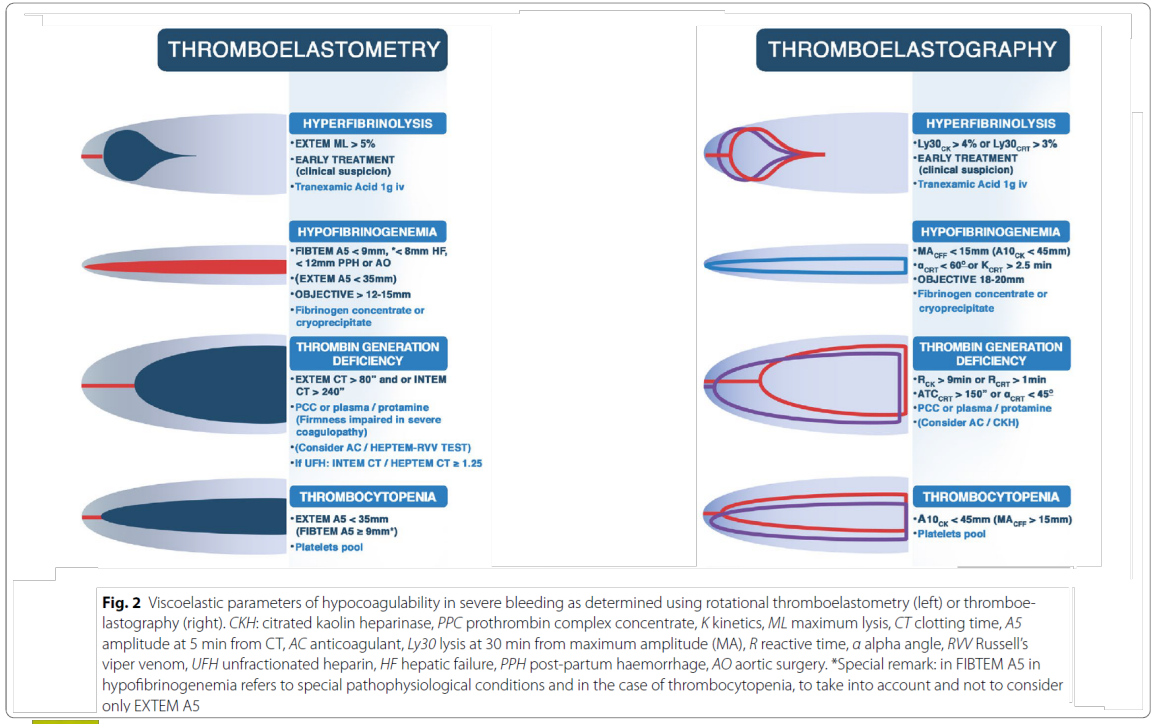
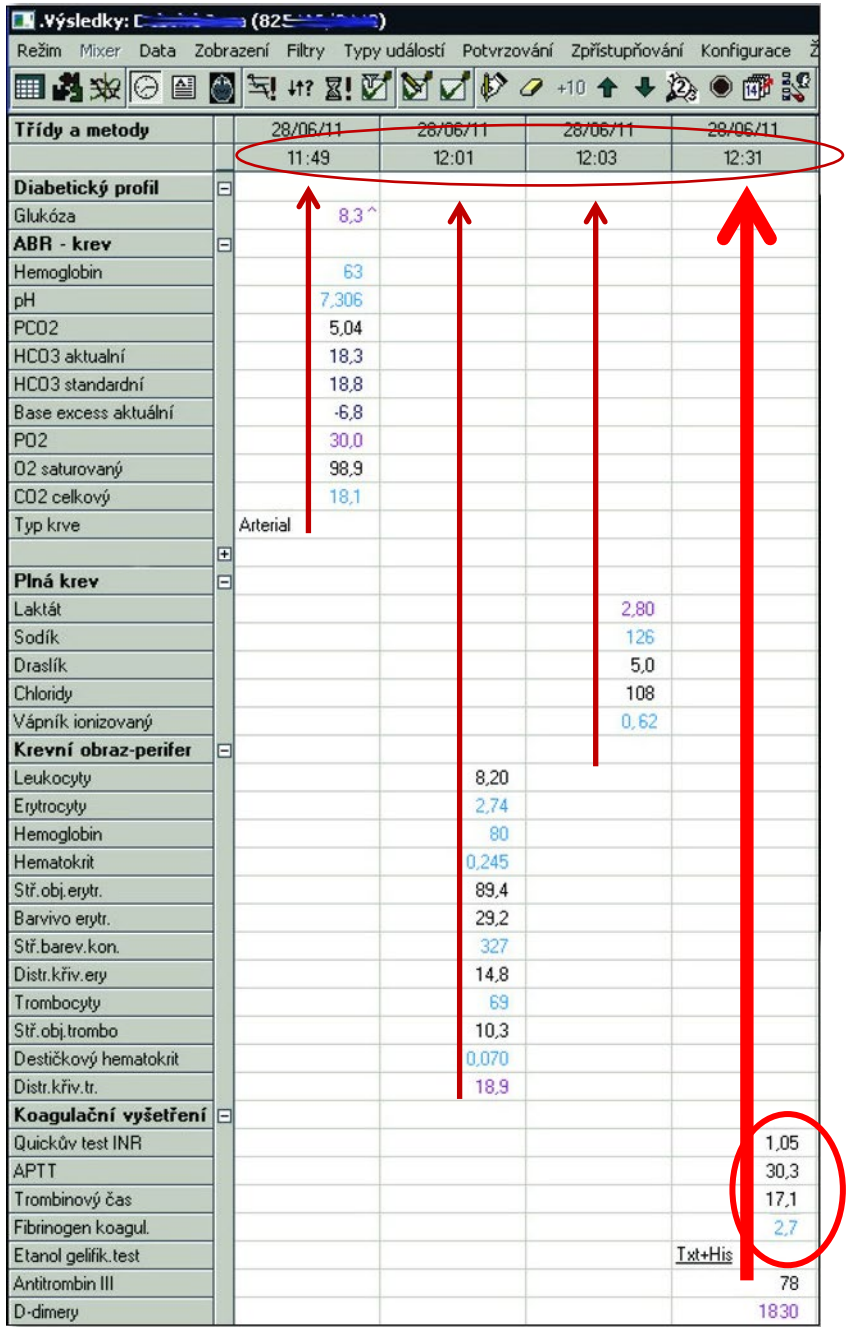
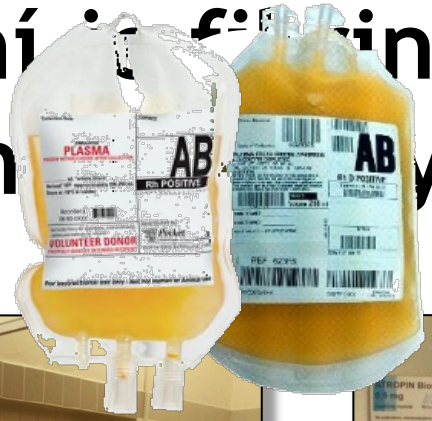


Fig. 2 Viscoelastic parameters of hypocoagulability in severe bleeding as determined using rotational thromboelastometry (left) or thromboelastography (right). *CKH*: citrated kaolin heparinase, *PPC* prothrombin complex concentrate, *K* kinetics, *ML* maximum lysis, *CT* clotting time, *A5* amplitude at 5 min from CT, *AC* anticoagulant, *Ly30* lysis at 30 min from maximum amplitude (MA), *R* reactive time, *α* alpha angle, *RVV* Russell's viper venom, *UFH* unfractionated heparin, *HF* hepatic failure, *PPH* post-partum haemorrhage, *AO* aortic surgery. *Special remark: in FIBTEM A5 in hypofibrinogenemia refers to special pathophysiological conditions and in the case of thrombocytopenia, to take into account and not to consider only EXTEM A5



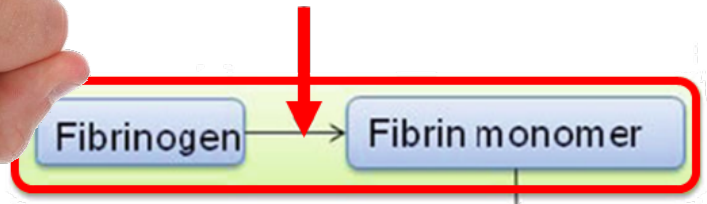
Maier et al. Intensive Care Med (2024) 50:319–331

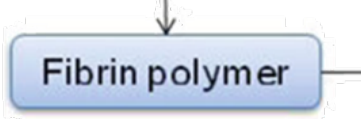
U masivního krvácení je fibrinogen prvním faktorem, který dosáhne kritické nízké hladiny!



35
minut

8
minut

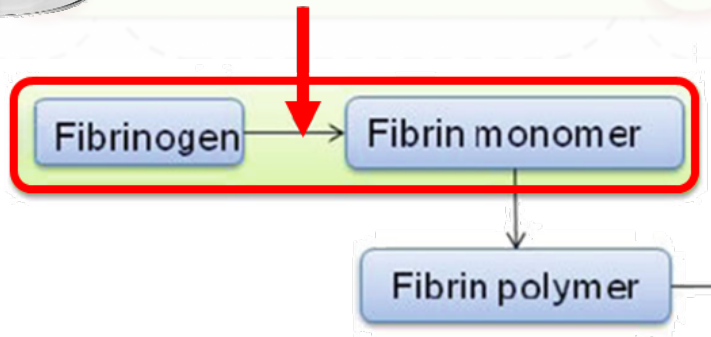




Swanepoel et al. Inflammation (2015)

U masivního krvácení je faktorem, který dosáhne k

Brenni M, et al. Acta Anaesthesiol Scand. 2010;54:11



Swanepoel et al. Inflammation (2015)

Anaesthesia 2019, 74, 984–991

Four years' experience of a ROTEM®-guided algorithm for treatment of coagulopathy in obstetric haemorrhage*

H. McNamara,[1] **C. Kenyon,**[2] **R. Smith,**[3] **S. Mallaiah**[1] and **P. Barclay**[4]

1 Consultant Anaesthetist, Liverpool Women's NHS Foundation Trust, Liverpool, UK
2 Consultant Anaesthetist, Mid Cheshire Hospitals NHS Foundation Trust, Crewe, UK
3 Consultant Anaesthetist, Chelsea and Westminster Hospital NHS Foundation Trust, London, UK

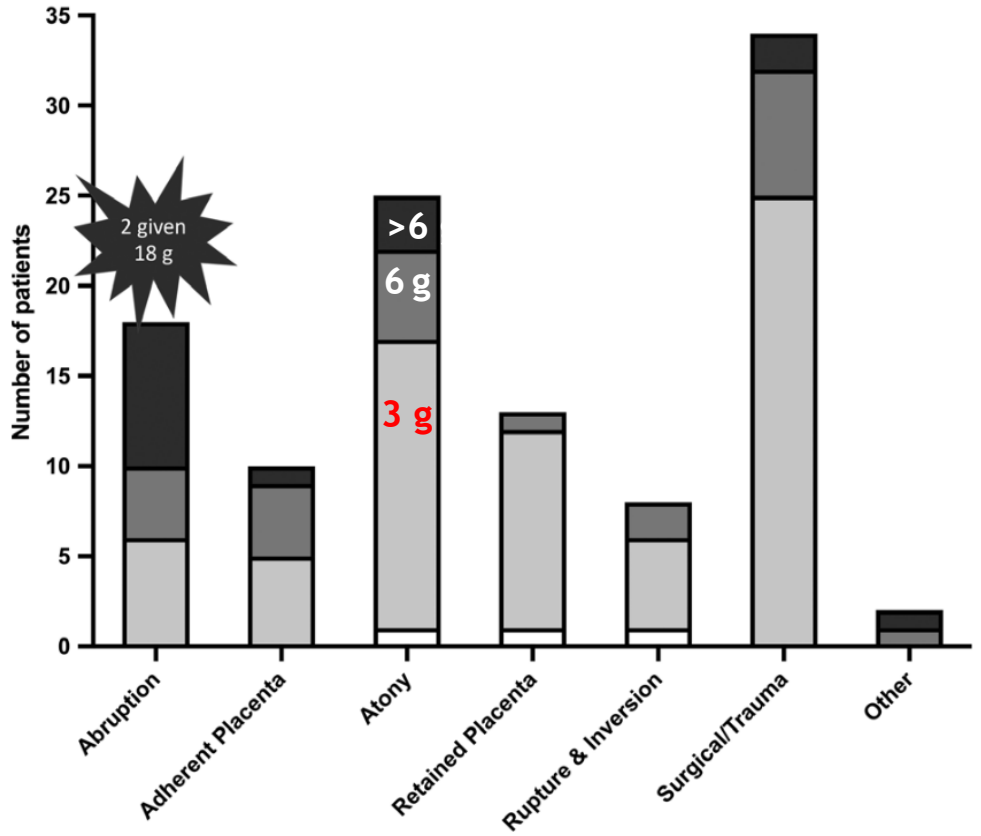
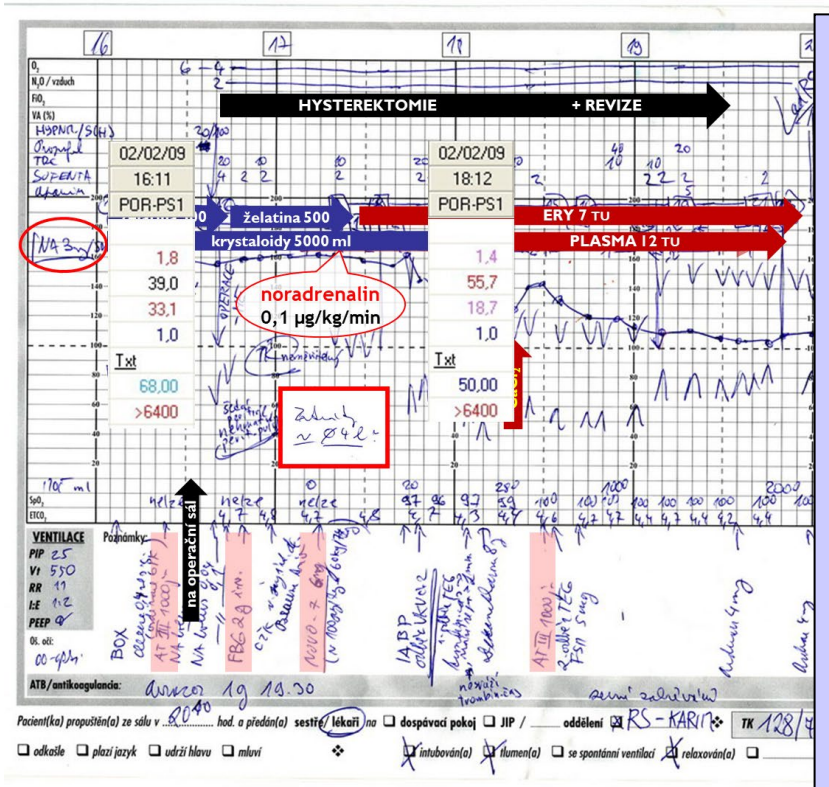


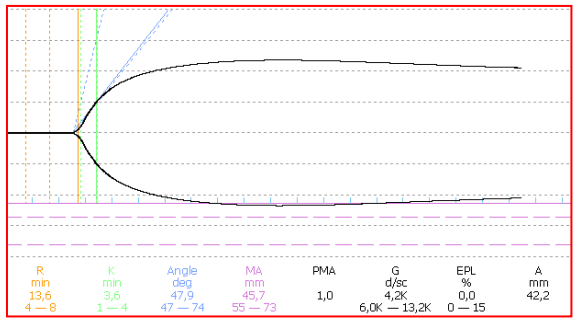
Figure 5 Dose requirements for fibrinogen concentrate, by aetiology. Number of patients given < 3 g (□), 3 g (▩), 6 g (■) and > 6 g (■). The dose given for those with abruption was significantly higher than for retained placenta (p = 0.003) or surgical/trauma (p = 0.024).

2009

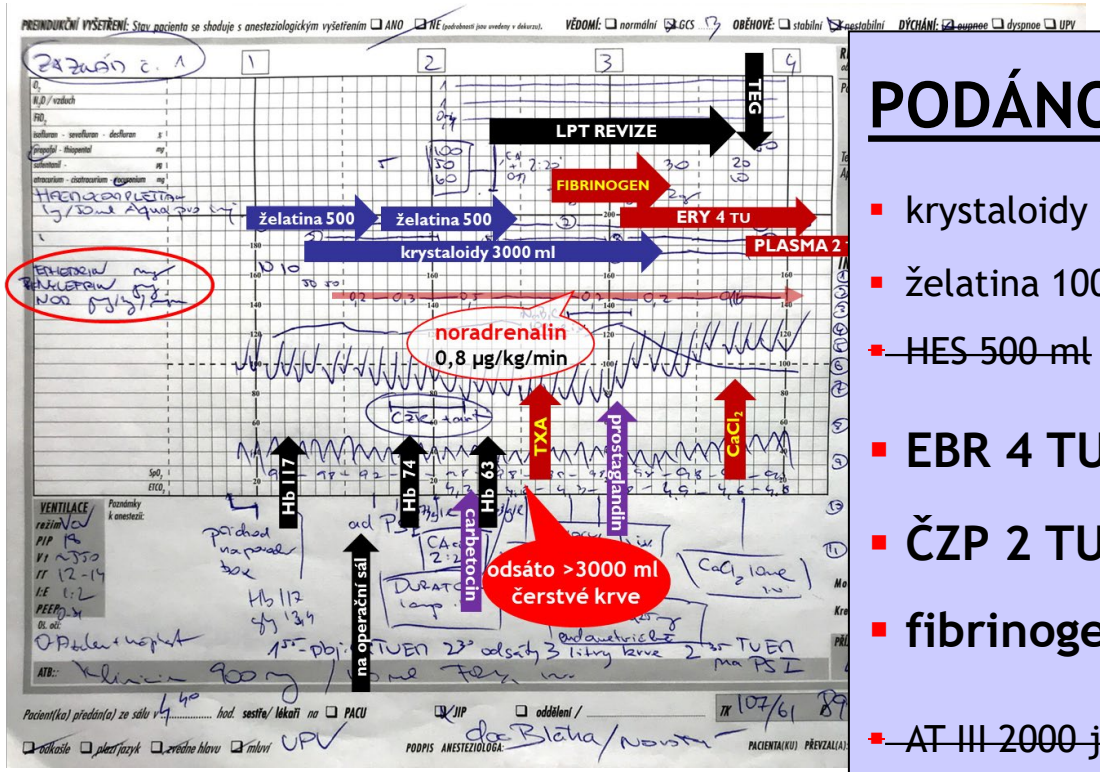


PODÁNO:

- krystaloidy 5000 ml
- želatina 1000 ml
- HES 500 ml
- **EBR 7 TU**
- **ČZP 12 TU**
- **fibrinogen 2 g**
- AT III 2000 j.
- NovoSeven 6 mg
- kalcium

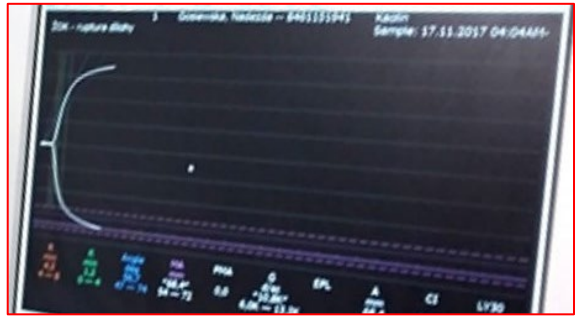


2020



PODÁNO:

- krystaloidy 3000 ml
- želatina 1000 ml
- ~~HES 500 ml~~
- **EBR 4 TU**
- **ČZP 2 TU**
- **fibrinogen 8 g**
- ~~AT III 2000 j.~~
- ~~NovoSeven 6 mg~~
- kalcium
- Exacyl (kys. tranexamová)



jan.blaha@vfn.cz